

## SUPPLEMENT.

# The Mining Journal,

## RAILWAY AND COMMERCIAL GAZETTE:

FORMING A COMPLETE RECORD OF THE PROCEEDINGS OF ALL PUBLIC COMPANIES.

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## Original Correspondence.

## FOREIGN MINING AND METALLURGY.

The new year has opened well for the Belgian Coal Trade, there being a great influx of orders, while the high prices recently current are firmly maintained. The navigations, which had been interrupted by floods, have also been resumed. The comparative mildness of the winter has, of course, exerted some little influence on the demand for coal for domestic purposes; but, on the other hand, coal for industrial purposes has been in greater request than ever. The aspect of affairs is encouraging to the coal trade in all the Belgian basins; the only complaints which are made relate to the scanty supply of means of transport, as well on the State Railways as on the Great Central Belgian system. M. Urban, manager of the last-mentioned concern, has had an interview on the subject with the local Association of Colliery Proprietors, but the results of this interview have not transpired. Upon the whole, there appears to have been some improvement established in traffic arrangements during the last 12 months upon the Belgian lines.

There has been no great amount of business passing in copper at Paris, although transactions may be expected to increase as the month advances. Chilian in bars, delivered at Havre, has made 90*l.* 8*s.* per ton; ditto in ingots, 96*l.* per ton; tough English, 94*l.* 10*s.*, and Corocoro minerals, 94*l.* per ton. At Havre, Chilian copper has exhibited a little more firmness in consequence of encouraging advices from England. The range in the price of Chilian copper at Havre last year was from 86*l.* to 114*l.* per ton, the closing price of the year being 94*l.* per ton. At Cologne and Hamburg copper has been in good demand. Tin has been firm at Rotterdam, Banca, with delivery in the spring, having brought 85*l.* to 86*l.*; Billiton has been quoted at 83*l.*; ditto under sail, 82*l.* There has been very little passing in tin at Paris; Banca, delivered at Havre or Paris, has brought 150*l.*; and Straits and English, 146*l.* per ton. At Cologne tin has been in good demand, and prices have advanced. Lead continues in request upon almost all the markets. At Paris, French lead delivered, at Paris, has brought 23*l.* per ton; Spanish, delivered at Havre, 22*l.* 16*s.* per ton; and English, delivered at Havre, 22*l.* 16*s.* per ton. At Marseilles the lead market has been comparatively quiet; at Cologne and Hamburg the article has been very firm. There has been no great amount of business passing in zinc at Paris, but prices have been supported with firmness. At Marseilles, rolled Vieille-Montagne zinc has been dealt in at 34*l.* per ton, with a discount of 3 per cent. In Germany the zinc markets have remained firm.

The intelligence received in France from England is calculated, of course, to give increased firmness to coal prices in France; at the same time, quotations continue to reflect the influence of local circumstances. The sale of household coal, for instance, at Paris has been rather materially curtailed by the mildness of the season; prices have sunk to 4*s.* per ton delivered, and a heavier depreciation is looked for in consequence of large arrivals and considerable stocks at the Aubervillers dépôt. On the other hand, industrial coal continues scarce and dear, deliveries not having been resumed with all the activity desirable, and being still interrupted by floods. Upon the whole, neither an advance nor a fall is anticipated for some time in the price of coal in France. The sugar works have generally completed their season; this has brought a certain relief from a consumptive point of view. As the coal production of France, notwithstanding the increase which it has undergone, has become every day more and more insufficient, public opinion encourages all efforts made to increase the extraction. In the basins of the Nord and the Pas-de-Calais the activity displayed in this direction is greater than in any other part of the Republic. On all sides colliery proprietors in these basins are either improving their tools and appliances, or they are sinking new pits; they do not, perhaps, know better how to employ the considerable and exceptional profits which they have realised during the past twelve months. The Saint-Eloi (Puy-de-Dôme) Collieries Company has duly provided this week for the coupons which have matured upon its obligations.

The past year was a very favourable period for the development of metallurgical industry in the Rhenish provinces and in Westphalia. The demand for iron was, indeed, so well sustained throughout last year that it was well nigh impossible to satisfy it. At the commencement of the year merchants' iron stood in the Rhenish provinces at 10*l.* 4*s.* to 10*l.* 16*s.* per ton, but at the close of the year it could not be procured for less than 19*l.* 10*s.* per ton. This great advance in prices was not due to speculation; it was the result of more and more persistent orders based on requirements which could only be partially satisfied. As far as can be foreseen this demand is not likely to diminish; on the contrary, it seems probable that it will increase rather than otherwise. Guided by this impression, capitalists are preferentially devoting their capital to the creation and development of ironworks. The price of iron minerals also experienced a great advance in the Rhenish provinces last year; at the close of the year the best qualities brought 30*s.* per ton at the mines. The prices of raw materials rose, indeed, to such a point last year that the owners of some of the most important establishments decided to purchase collieries and ironstone mines for themselves. Herr Krupp, for instance, purchased for several million thalers collieries near Essen and some important ironstone mines in the Siegen district. Messrs. Jambi, Hanid, and Huysjen and the Union Company, of Dortmund, have done the same. The last-named company has purchased in Sweden some mines of magnetic iron minerals, some blast-furnaces, and some forests to supply them with fuel. The demand for rails in Germany greatly improved last year, and it promises to be very animated this year, as the German Government purposes to proceed with the construction of a large number of new lines should it obtain the authority of the German Legislature to do so. The extraction of coal in the basin of the Ruhr amounted in the first nine months of last year to 10,235,934 tons, as compared with 9,449,567 tons in the corresponding period of 1871. Notwithstanding a great strike, which prevailed in the summer and autumn, the production thus increased in the first nine months of last year to the extent of 738,367 tons.

The French iron trade presents no material change. Few new orders are noted, but prices are supported, nevertheless, with much firmness. Upon the whole, the new year promises well as regards the French iron trade, and no apprehensions are entertained as to a

fall in prices at present; on the contrary, pressing reasons accumulate every day for the maintenance of present quotations. Foreign buyers, who last year took very considerable quantities of French iron, have still very large requirements to satisfy; and as the deliveries made last year gave satisfaction, it is considered almost certain by French ironmasters that they will receive a fresh current of foreign orders in 1873. Attention is being a good deal directed in France to the Danks furnace; several firms in France are also occupying themselves with the establishment of three cylinder-rolling mills upon a new system. Commencing with this month, all exceptional customs tariffs accorded to metallurgical products entering France from Alsace and Lorraine are to cease and determine, and the commercial relations between France and the ceded provinces are to be subjected to the general tariff adopted between France and Prussia.

No important contracts appear to have been secured by the Belgian iron trade during the last few days, and prices remain nominally as they were. At the same time, the tone of affairs has been one of considerable firmness, especially since the receipt of the most recent advices from England. It is pig-iron which is the most scarce and the most in request, and only a very small reduction in prices can be anticipated as regards this article. Refining pig hard iron makes 6*l.* per ton, and casting ditto 7*l.* 4*s.* per ton. A question which is now a good deal discussed is, "How will the new year move on?" Many works have contracts to complete which will occupy them until July, and some contracts will not be worked out until November or December, and this at the prices of the last three months. These circumstances render the conclusion of new contracts rather difficult, as both producers and purchasers maintain an attitude of considerable reserve. The year seems likely to be a good one, indeed it is almost certain that it should be so, even if prices decline a little. A slight fall in quotations would, indeed, be probably advantageous for all parties rather than otherwise, but what Belgian ironmasters most desire is a fall in coal and pig. There are a good many contracts offered on German and Hungarian account, but very few Belgian tenders have been forthcoming; this result has been witnessed because Belgian firms are already well employed, and because present prices leave little chance of much profit being realised from distant affairs. MM. Dureux and Co., of Louvain, recently tendered for forged iron wheels for the right bank of the Oder Railway at 20 thalers per 2 cwt. A Danks furnace ordered at Middlesborough by the Sclessin Company has just arrived out.

## NEW PATENT REVOLVING PUDDLING-FURNACE.

Perhaps there is no sphere of thought or action in which human ingenuity is more conspicuously displayed at the present day than in that of inventing and introducing new puddling-machines. To such an extent has this tendency been carried in the Cleveland district that everyone who is connected with the iron trade, proximately or remotely, considers, or appears to consider, it a duty to himself and the country at large to do something in the way of augmenting the legion of puddling-furnaces now in the market. The custom is like that which prevails among ladies and gentlemen who affect literature, and who deem it an imperative duty to society—and to themselves—to write a book. But this seeking out of new inventions is less to be deprecated than the tendency to write stale books of travel or flat biographies. It has a practical and important bearing upon one of our staple industries, and leads more or less directly to a goal which all are seeking to attain—economy of material and labour. In the Cleveland district puddling-furnaces have been brought out by Mr. Jeremiah Head, the president of the local Institution of Engineers; by Mr. Spencer, formerly of Bolekow, Vaughan, and Co., and now with Messrs. T. Richardson and Sons, of West Hartlepool; by Mr. Crampton, by Mr. Thomas, and others. Not a few of the inventions patented in this district were simply modifications of old and well-known appliances that could scarcely claim to be particularly novel. Others were so novel that they were found to be utterly impracticable, and have been relegated, as they deserved to be, to the limbo of forgotten ventures; while others have retained permanent possession of the field, and are gradually finding their way into public favour. So far as puddling-furnaces are concerned, the idea has long prevailed that they should be constructed on the rotary principle. In Middlesborough that idea was possessed and enunciated by practical men long before Mr. Danks came over from Cincinnati, and caused such an upset among the Cleveland ironmasters; and at the time his invention was proclaimed to the world there were those in the Cleveland district who were ploddingly endeavouring to attain the same end. We do not here propose to touch upon the delicate and tender question of priority of patents and discoveries, but—just as Professor Clausius, of Berlin, propounded his theory of the development of heat as one of the forces of thermo-dynamics simultaneously with the late Professor Rankine—it is possible, and even probable, that others arrived at the same results as those achieved by the rotary puddling-furnace simultaneously with Mr. Danks, although he may have attained priority of others in the publicity of his valuable invention. At all events, we know that Mr. Spencer and Mr. Thomas have applied themselves for some years past to the perfecting of furnaces having the same cardinal characteristics. In this article we propose to describe briefly Mr. Thomas's puddling-furnace, which is just now a good deal talked about in Cleveland, and with which it is shortly proposed to make experiments, with a view to test its practical utility.

Mr. Thomas is a partner in the Acklam refinery at Middlesborough, and inventor of the process adopted at that establishment for the refining of iron. He has been working at his puddling-furnace, as already stated, for a considerable time, but it was only at the last meeting of the Cleveland Society of Engineers that he ventured to make its *rationale* known to the public. The inventor's scheme of a puddling-machine consists of a pan-wheel revolving round a fixed centre. The pan is set on rollers, adjustable with a wedge and screw under the bearings. The rollers, with the pan-wheel thereon, are fixed on a carriage with wheels; by wheeling out this carriage, the revolving pan can be drawn off clear from the fixed centre, which is built with bricks between two hollow discs, supported on a strong shaft. Apertures are made through the centre brickwork for letting in the gas and air for agitating the metal when necessary, and for

letting out the burnt gas, leading it to the stove for heating the air. The revolving, or pan-wheel, is made by setting two or more rings on the rollers, and fixing T iron across them to form the bottom or pan of the wheel. The ends are fastened with angle iron rings, and the cross irons are filled up between with oxide of iron, so as to form the bottom. When working, a small stream of water is run round the angle iron rings at the end of the pan-wheel, to keep down the temperature. Water is also run through the holes that support the fixed centre brickwork. There is an air valve and a gas valve for regulating the quantity to be admitted.

It is proposed to enclose the whole machine with a double-plate canopy, having an air passage between the plates to keep the outside cool. The front of the canopy is intended to be fixed on the carriage, so as to keep off the heat of the pan-wheel from the workmen while taking out the ball. When the revolving pan-wheel is hot enough the metal in the gas-generating and melting furnace is tapped, and runs by gravitation into the pan. Revolving slowly at first, a full quantity of gas and air is kept on to well heat the metal and fluxes. When necessary iron bars are thrust in to stir up and thoroughly mix the metal with the melted oxide. When the iron begins to agglomerate the air is eased off and the gas increased, the damper with the waste gas culvert being lowered. The machine is then made to revolve faster that the iron may turn and fall more quickly. By this means the sub-oxides in the iron are reduced, and by the rapid falling into the cinder the excrescences of the ball will be welded into the ball itself, also being thereby condensed by having its cinders knocked out of it. When the ball is ready the revolving pan-wheel is withdrawn from the centre and the ball taken out. If the ball-wheel requires fettling it is made to revolve, and the liquid cinder is worked from side to side with a rabbler until it sets hard. If there be too much cinder an iron ladle is introduced, which lades out the cinder into a bogey to be taken away. The patentee heats his air by the waste steam and waste heat; the air is passed from the boiler into a stove of pipes laid horizontally, and then all the waste gas from this goes into the stove to further heat it. The total diameter of the revolving furnace will be about 7 ft. inside, and the heat is confined by the gutter all round. We need only add that the patentee is now making some of his puddling-machines, and that their merit will soon be fully and publicly tested.

## NOVA SCOTIA IRON MANUFACTURE.

## THE ACADIA IRONWORKS.

The recent rise in the price of iron has given considerable importance to ores in Nova Scotia—lying within working distance of the magnificent seams of coal which are found in Nova Scotia proper—and the island of Cape Breton. Up to the present day, however, with one exception, no iron smelting and manufacturing works have been in continuous operation. The Acadia Works, at London Derry, Colchester County, have long been known as furnishing iron and steel of very superior quality, and these are the only existing representatives of an industry which soon promises to become of considerable magnitude in the province. The development of coal mines, the discovery of beds of iron ore in close proximity, and the completion of the Intercolonial Railroad in Nova Scotia, with subsidiary branches, point to stirring times in iron and coal, and to a lucrative employment for capital.

The Acadia Ironworks were commenced in 1849, and up to the present day charcoal has been used as the fuel for smelting, and an expensive but very superior iron produced. The Intercolonial Railway has established connection between the coal seams of the Cumberland Basin, at Springhill, and the Acadia Works, the distance apart being about 34 miles, thus facilitating to a remarkable degree the production of cheap iron and the extension of the works. Added to these increased facilities of production, the concurrent advantages to be derived from a considerable rise in the value of the marketable product, the certainty of an inexhaustible supply of iron ore and superior coal, there is now to be chronicled the introduction of new capital, with the impulse and energy which the name and association of one of the most successful and enterprising men of the day—Sir Hugh Allan, of the Allan Line—in the further development and working of the Acadia Ironworks of Nova Scotia.

A brief description of what has been done, and a glance at what is proposed to be done, may place a rising industry, susceptible of immense development, fairly before the mining public, and in a shape hitherto impracticable on account of the great drawback in all new countries—the want of suitable means of communication, now supplied by the Intercolonial Railway and its offsets.

*The Ore and its Distribution.*—The property extends over a space of 13 miles in length, on the south flank of the Cobequid range of mountains. At and near the junction of the carboniferous rocks and older metamorphic strata, a great fracture, or rather a series of fractures, appears to have occurred, which is the seat of the veins holding the ore. These fractures have been traced for a distance exceeding 30 miles, and they vary in breadth from 30 to 150 feet. The veinstone chiefly consists of the mineral ankerite, a mixture of the carbonates of iron, lime, and magnesia. The ankerite itself is a poor iron ore containing from 16 to 25 per cent. of carbonate of iron; it is used in the smelting furnace as a flux. The ore itself occurs chiefly in the form of brown hematite or limonite, in the botryoidal, stalactitic, and compact forms. It is from this ore that the furnace is in the main supplied.

Red hematite is also of no uncommon occurrence, and is used to mix with the brown ore in certain proportions. Specular ore is found in small masses and scales; it is used for fettling in the puddling furnaces. It was formerly supposed that the brown ore was the most abundant near the surface, but recent discoveries have established the fact that this ore may exist at any accessible depth in the great fractures on the Cobequid range. At one locality, about two miles from the furnace, adit levels have been driven on the course of the vein (east and west, nearly), which, in a vertical depth of about 350 feet, expose upwards of 20,000 tons of ore, with an increase in thickness of the deposit as the depth becomes greater. The thickness of the main vein of ore is here, at some points, over 20 ft. Masses of the country rock, or "horses," are numerous in the vein-stone and occasionally in the brown ore. Sometimes the mass of vein-stone assumes the form of a breccia, whose angular particles are

cemented by the mineral ankerite. In the brown ore vein "horses" are not uncommon, and the whole mass of the vein is so honey-combed and vesicular that surface water rapidly penetrates from the highest to the lowest adit level in a vertical altitude of 350 feet. About half-a-mile north of the great vein is another vein, but little is known of its capabilities; the stores of ore in sight being sufficient for several years' consumption. Throughout the extent of the property, a distance of 13 miles, the brown ore has been traced at the surface, and in many places it has been quarried, but systematic mining has only been commenced in the western section. The vein, as proved about two miles to the west of the works, appears to establish the important fact that this extraordinary distribution of iron ore is not generally confined to the surface in a wedge-shaped form, as formerly supposed, but extends downwards to great depths, being, in fact, a true fissure vein, or series of fissure veins, of vast extent and depth. (An excellent description of this extraordinary deposit was written by Dr. Dawson, in 1849, and is reproduced in the second edition of his "Acadian Geology," 1868. Papers on the Londonderry Iron Ores, &c., have been published by Dr. Honeyman in the "Transactions of the Nova Scotia Institute of Natural Science," and by Dr. How in his "Mineralogy of Nova Scotia.")

**Cost of Mining.**—The average cost of mining the ore, exclusive of "dead work," &c., is \$1, or 4s. 2d. per ton, delivered at the mouth of the level. The ore has to be carted to the furnace, a distance of two miles from one point, and three miles from another, at a cost of 60 cents, or 2s. 6d., and 84 cents, or 3s. 6d., sterling per ton respectively, in the absence up to the present time of rail or tramways. The total cost of the ore at the furnace, with the addition of the "dead work," &c., is about \$2 and 50 cents., or 10s. 6d. sterling a ton. The ankerite or flux is found in abundance close to the furnace, and when limestone is required it is brought a distance of three miles from beds which appear to lie nearly parallel to the course of the veins, or about due east and west magnetic, the variation being 21° west. The mean elevation of the country where the ore is obtained is 600 ft. above the sea level, and the mountain range is intersected by profound narrow valleys, or gorges, at right angles to the course of the vein, and cutting it to the depth of from 300 ft. to 380 ft., so that every facility is afforded for driving levels on the vein at different depths, and winning any quantity of ore that may be desired. Already a level has been driven to the vein at a depth of 350 ft. from the surface, and a breadth of ore of the highest class has been intersected, averaging from 9 ft. to 23 ft.

**The Furnace.**—There is at present only one blast-furnace in operation, but the construction of another furnace will be commenced early next spring. The altitude of the existing one is 30 ft., its diameter 9 ft. at the boshes, and it will smelt 2300 tons of iron per annum. The blast-engine is driven by an overshot water-wheel 20 ft. in diameter, and 5 ft. in width. The blowing-cylinder has a diameter of 5 ft., with a 5-ft. stroke. The average yield of iron is about 50 per cent., and the consumption of charcoal varies from 135 to 145 bushels per ton of metal. In July of the present year (1872) the quantity of pig-iron produced, and the materials used in the process, were as follows:—

Pig iron produced	222½ tons.
Ore used	407 tons 17 cwt. 1 qr. 18 lbs.
Ankerite (flux)	77 tons 5 cwt. 1 qr. 17 lbs.
Charcoal (hard wood)	31,711 bushels, or 142½ bushels of charcoal per ton of iron.

The former cost of hard wood charcoal was 6 cents a bushel, but during the last year the price has increased to 7 cents a bushel, owing to the general rise in labour and the necessities of life. The works give employment to about 110 charcoal burners, who in 1871 produced 158,140 bushels. The mode of preparing charcoal is that of burning in circular piles, about 12 ft. high and 25 to 30 feet in diameter. The wood is placed upright instead of horizontally; it would be more economically, as experience has proved, to lay the wood horizontally in preparing the heap; a saving of from 8 to 10 per cent. would be effected by adopting the horizontal method, as practised in Sweden.

Swedish charcoal is usually made from the pine, the Nova Scotia charcoal exclusively from hard wood, principally white birch, with beech and maple, and the relative weights of the products would be as 170 (soft wood) is to 227 (hard wood), or 164 lbs. to 219 lbs. for the charcoal bushel. The price of Swedish charcoal is 4 cents, for 13½ lbs., and of Nova Scotia charcoal 7 cents for 22½ lbs. In Sweden, generally, 2 tons of ore require 166 bushels of pine charcoal, weighing 13½ lbs. to the bushel, to produce 1 ton of cast-iron. At the Acadia Works 2 tons of ore yield 1 ton of iron, with the consumption, on an average, of 150 bushels of hard wood charcoal, weighing 21½ lbs. to the bushel. At Hull, in Canada, the consumption of hard wood charcoal for the ton of metal was 170 bushels. At the St. Maurice Ironworks, Quebec, the ore yields 43 per cent. of iron, with a consumption of 161 bushels of mixed wood charcoal. At Marquette, on Lake Superior, 140 bushels of charcoal are required to produce a ton of iron from ores yielding 55 per cent. At Detroit the red hematite of Lake Superior yields 65 per cent. of iron, with the consumption of 140 bushels of soft wood charcoal, and in some of the blast-furnaces in New York and Michigan the consumption is stated to be as low as 100 to 105 bushels per ton of iron (vide "Geology of Canada," Dr. Sterry Hunt).

At the Acadia Works the quantity of charcoal consumed in the manufacture of a ton of iron varies considerably. In September, 1871, 223½ tons of metal were produced with an average consumption of charcoal not exceeding 135 bushels per ton. In August, 1871, the amount consumed per ton was 140 bushels. In July, 1872, the average consumption was 142½ bushels, while the general average in former years is stated to have been 150 bushels per ton, which, however, included the charcoal required to heat up the furnace at least twice a year.

It will be readily understood that in the foregoing statements of the relative quantities of charcoal consumed at ironworks in the production of a ton of pig-iron other conditions, besides variations in the quality of the ore, have to be taken into consideration before an accurate comparison can be made. The bushel measure, for instance, used at different works, frequently varies in capacity. At some of the American furnaces the bushel contains 2800 cubic inches, and this is stated to be the usual measure in the Eastern States, although bushels of 2600 and 2675 cubic inches are also used. Hence comparisons by the bushel, unless the exact capacity is given, are loose and unsatisfactory. Again, at some works, the charcoal is measured as it goes to the furnace, while at others the quantity received from the charcoal-burners is made the basis of calculation. Experience shows that the difference in the mode of measurement causes an apparent consumption of 8 or 10 per cent. more charcoal when the amount received from the charcoal-burners is adopted for comparison. At the Acadia Works this is the method pursued.

**Pig-iron produced.**—The total amount of charcoal pig made at these works, from their first establishment, in 1849, to the present time, reaches about 30,000 tons, of the aggregate value of \$968,000, or 200,000£. sterling. A considerable portion of this has been worked up into bars, steel, &c., in various subsidiary departments, which will now be described.

**The Forge.**—Adjoining the blast-furnace is the forge, a building 180 feet long by 60 feet broad. Here are five puddling and one heating furnace; a 50-horse power steam-engine for driving one set of bar rollers and one set of sheet rollers. A 12-horse power engine is used for driving the fan supplying the blast to the furnace, working the force-pump, and the bar shears. There is also in the forge a 25-cwt. steam-hammer.

**The Steel Works.**—These are in a spacious and well-built structure, 250 feet by 40 feet in dimensions, and situated about a quarter-of-a-mile from the forge. They contain one smelting furnace with eight holes, capable of turning out 2 tons per day of crucible steel; one converting furnace with two pots capable of converting 20 tons of bar-iron each charge. Two steam-hammers, one 20-cwt. and one 7-cwt. Three heating furnaces; one flue boiler, 20-horse power; one engine, 8-horse power, for driving fan, &c.; one 25-horse power engine, with 10-inch train of rolls. The cast-steel produced here is equal to the best Sheffield brands.

**The Casting-house.**—Adjoining the steel works is an extensive establishment for castings, among which chilled wheels for railway purposes are the most prominent. In 1871, 3315 car wheels were

manufactured, and in nine months of last year the number of car wheels produced reached 3763. These wheels are sent to different parts of the Dominion, a few have also been dispatched to Mexico and to India. This department of the works is carried on in a T-shaped building, the total length of which is 310 feet, with a breadth of 40 feet. It is supplied with two furnaces, and excellent and powerful machinery for all the details of the manufacture.

**Future Prospects.**—The completion of the Intercolonial Railway, and its connection by short branch lines with the Acadia Ironworks on the one hand and the Springhill coal seams on the other, will effect a great change in future operations. Hitherto every article not produced on the spot has been carted from Truro, a distance of 21 miles, at an average cost of \$4, or upwards of 16s. sterling, per ton. Carriage by rail will reduce the cost to one-eighth of the past rates, or even less. The company have constructed about nine miles of excellent roads to the adit levels where the ore is stored, and at present about 4000 tons are maintained in store in advance of the furnace, from the great deposits which have been reached. Another 4000 tons lies ready on the surface of the ground, having been obtained from surface workings.

The Springhill coal, from the fine eleven-feet seam opened by the Springhill Company, which has been shown by experiments and analyses to be of the best quality, can be laid down at the works on completion of the short branch line to the Intercolonial, now in course of construction, at a cost of \$2½, or 9s. sterling, per ton. The requirements of the ironworks will reach 40,000 tons of coal per annum on completion of the second blast-furnace, and their influence will necessarily be immediately felt to the advantage of the coal proprietors and the authorities of the Intercolonial Railway. In view of the great abundance of ore now known to exist far and wide on the flanks of the mountain range where these works are situated, and the great facilities which easy and cheap transportation by rail will afford, coupled with an abundant and accessible supply of cheap fuel of excellent quality, it is not unwise to predict a future industry in the Cobequid Mountains, which will exercise considerable influence upon the prosperity of the province. H. Y. H.

#### THE UTAH SILVER MINING COMPANY.

**SIR.**—Finding the points raised by Messrs. Bennett and Taylor against my management of this company's property, as also the remarks of your correspondents, "Utah Shareholder" and F. Bennett (who, by the way, seem to be one and the same), so very unfair and illogical, and being evidently so made as to lead the Utah shareholders into an unfair prejudice towards me, unless the other side of the question was placed before them, that I am obliged to trespass on the columns of the Journal to do so.

Mr. F. Bennett's chief aim seems to be to advertise himself and his friend, Mr. H. Sewell, as the "eminent mining engineers and metallurgists, par excellence, and whose mission they themselves would have the mining public believe to be to guard, defend, and protect the interests of the Utah shareholders in particular, and all mining shareholders in general. Mr. Bennett seems very desirous of obtaining the credit for his friend, Mr. Sewell, of having first recommended the new style German jiggers, and dressing of the ore, &c. Now, were it even true it would matter little to the Utah shareholders as long as it was not possible to carry it out; but, as it is not true, it is well to set them right on the point. To do this I must state that, having only commenced work on the mines Jan. 19, 1872, on the prospect then before me, it was well towards the end of February following before anything like evidence to justify the outlay for permanent works was presented; and then, from the excessive flow of water in the ground, which left it impossible to mine without machinery, the first thought naturally was to provide means to work and prove the mines. This I did with the small amount of money at command, after paying off the old indebtedness of the company. Although then strongly believing in the great advantage to be gained in dressing the ore, I could not enter on the plan, well knowing that all the money at command was more than required to prove what the property was. What could I do in the absence of means to do it with, even had I been satisfied of the permanent merits of the property, which at this time I was not? It was some time about the middle of March following when, in conversation with Mr. Sewell, and while describing to him what I intended doing as soon as means would permit (to dress the ore by the use of the old German jigger, the puddle, and other contrivances for concentration with which I had long experience), that Mr. Sewell said I ought to try some of the new style German, or continuous, jiggers, which he said were in use at the Van Mine. This is the first time he ever spoke of jiggers, or dressing of the ore. And now, let me tell Messrs. Bennett and Sewell that they should first learn what these new style German or continuous jiggers are, and how far they are adapted to the purpose in question, before they undertake to advise their use exclusively on the Utah Company's mines. Let them go to the Van Mine, where they will see and hear much which they, as eminent metallurgists, ought long since to have known—that these jiggers, so much harped upon by these gentlemen, are only used for separating the last traces of metal from the tailings, they being deficient in dispatch for the better grades of ore. Here they would see, on the three most extensive lead dressing-floors in the world, I believe, under the most practical and capable man (Captain W. Williams), that out of some 150 pieces of dressing machinery he only employs 10 of those new style German jiggers, and that he (Captain Williams) does not want any more of them, and that they are only used on the tailings, while the balance of the dressing apparatus consists of the revolving sweeps, old style German jiggers, and puddles, with a few other very simple contrivances of the captain's own invention, which, with a set of Cornish rollers, I always held to be the very thing that was wanted to dress the Utah ore. Well knowing the cost of erecting a dressing-floor, I could not attempt it without money. My only course, then, was to develop the mine with what funds I had, and resort to smelting (to which I was always opposed up in the mountains), as a source of revenue to assist in proving as much as possible the value of the mines; in this I was successful, to the amount of \$8331.

Mr. Bennett's charge of deception, as he calls it, where he says I did not include cost of purchased ore in smelting cost, should hardly need explanation, as anyone can see in the item of total mining cost of the 1504 tons smelted must include in the charge of \$10,971 the price paid for ore purchased, as can be seen in weekly reports of smelting, and set down in my report. Mr. Bennett seems to lay great stress on the remark of Mr. Clayton, where he says, "that buying ore from adjacent mines was like carrying coals to Newcastle, and that he (the Professor) could not see why the western portion of the company's property should be so long neglected," &c. Why, or how, the Professor has fallen into this error I cannot understand; a man of his usual caution in such matters, and one who takes so much pains in his examination of mining properties, could only do so by being misinformed as to the western boundary of the mines. All the works of the property are placed on the western limit of it; the main tunnel on the Red Warrior; the tunnels to the Dartmouth and Belshazzar are on the very end of these locations to the west, and the discovery made of carbonate ore in the Dartmouth Mine in September and October last is right on the extreme western boundary of that mine and the Belshazzar. And he should have noticed several hundred feet of levels, drifts, and tunnels run in fruitless search for carbonate ores in the very locality referred to. It does look as though the Professor was examining the ground through a pair of Bennett-Sewell glasses when he discovered similar ores to those contained in the West Jordan Mine of the same carbonate class, &c. No one could have wished more earnestly than myself that it were so, or have tried harder to prove it so, than I did; and that it is not so, with the exception of the discovery made in September last on the extreme west end of the ground, I can only regret.

This discovery by the Professor, and heralded by Mr. Bennett, is in keeping with that made by Mr. Bennett's friend—Mr. H. Sewell—of "Thousands upon thousands of tons of rich gold ore" in the fall of 1871 in these mines, for not having mentioned which in my report to the board on June 5 Mr. Bennett took me to task before the directors at that meeting. Now, this reputed discovery was made towards the latter end of September, 1871, and immediately thereafter circulated in London by Mr. Bennett, and persisted in even to June 5, 1872, by that gentleman, as above stated, when there was not a shadow of a foundation from the first to the present that 1 ton of such ore as \$3884.87 per ton existed in the property, much less "thousands upon thousands" of tons, as expressed by Mr. Bennett, of ore of that value. Mr. Bennett further claimed on June 5, 1872, that 40 tons each day could be taken from the mine of 65 per cent. lead ore, with \$24 per ton silver, giving Mr. Sewell as his authority. Now, were this true there would be little necessity for dressing the ore, as 65 per cent. ore is good enough if it were to be found in such quantities as 40 tons each day; but, like his \$3884.87 per ton ore, his saying so unfortunately did not make it so.

Now then, when it is known that Mr. Bennett's source of information being through Mr. Sewell, as he states himself, and that the last time Mr. Sewell ever saw the property was in Sept., 1871, when, as it is well known, the last underground development of any kind on the mine under the old management was discontinued, the carbonate ores were then declared by the managers to be exhausted, except some slight prospects on the surface, and nothing was in sight but a large mass of iron pyrites, carrying from 12 to 18 per cent. of galena; and yet, with all these facts before these most eminent metallurgists, they then and there advocated the building of four 40-ton (each) furnaces, right up at the mountain tops, when there was not 50 tons of ore—except the sort above mentioned—anywhere in sight in the whole property, nor 1 foot of downward development done on the mines. There were two immense veins exposed in the old tunnel, run by Buel and Bateman, the one 30 ft. wide, and the other 56 ft. wide of the grade of ore above mentioned, and yet those eminent engineers and metallurgists did not then, nor at any time since, advise or suggest dressing the ore until I had first proposed it. I suppose it suited their purpose better to make the mining public of England believe there was the most urgent necessity for three additional Elephantine furnaces to the one then in course of erection. It was at this very time (how happy the coincidence) that Mr. Sewell discovered the "thousands upon thousands" of tons of \$3884.87 per ton in gold and silver. To all of this Mr. Bennett most strenuously adhered, even to the 5th of June following, eight months after the imposture was foisted on the London public. And no longer ago than Dec. 20 last Mr. Bennett at a meeting of the Utah Committee, claimed the property to be most valuable, because Mr. Sewell wrote him it was so, while Mr. Sewell positively never saw the property since September, 1871. But it may be asked what the object could be of all this? The answer is plain; and it is this—The exaggerations of this party had run the stock up to a premium of 15s. a share in July and August of 1871, and they must try and keep it up as long as possible to gamble on it. It answered their purpose much better to tell the people of London there were "thousands upon thousands" of \$3884.87 per ton ore in the mine than to give the Utah shareholders the benefit of their scientific lore, and advise the use of dressing machinery at the very time of all others, it should have been done, instead of building four 40-ton furnaces, as there was not a ton to be seen anywhere in the mine of 45 per cent. lead ore, until I opened it out in January and February, 1872.

Mr. T. G. Taylor charges me as being the cause of running up the shares to 15s. premium by my reports and statements, and that he knew some of my friends to have sold out at 15s. advance. I do believe Mr. Taylor to be too much of a gentleman to make any such statement, knowing it to be false, and I can only think that he must have been talked into it by some of this happy family to cover up their own foul deeds by charging them on me. It is but too well known that for nearly two months previous to the sale of the property to the Utah Company I had nothing whatever to do with it, being busily engaged smelting Flagstaff ore, and that until Jan. 16, 1872, I never communicated a single line to any director, shareholder, or other person, on any such subject, in London or elsewhere, except one letter to the Journal. Let Mr. Taylor, like a man who is disposed to be fair, give his proof. I did not know a single shareholder in the concern but Mr. Bateman, and he has never yet sold a share, even to this day. Let anyone look through my letters written to the directors, copies of all which are before me, when they will at once see whether my estimate of the property has been overdrawn or not. As to my "concealing," as Mr. Taylor sees fit to call it, the indebtedness of the company, I have nothing to say here, it being fully explained in my printed report to the directors.

Mr. Taylor lays much stress on the remarks of Professor Clayton as to management, dressing ores, &c. The Professor's remarks are, in substance, exactly what I stated to him as well as to hundreds of others with whom I conversed on the property and its mode of treatment, and what I had held, too, since last March, that should be done to make the ore pay. But money we did not have, while it required money to do it. Mr. Taylor preferred to make all his charges *ex parte*, and desired I should not be present; had not Mr. Taylor insisted on this piece of unfairness towards me matters which I am now obliged to explain in public print could have been set right in a few words at the meeting, had I been granted the privilege of being present, which undoubtedly was my right. But this did not suit Messrs. Taylor and Co., who had, as they stated in public, made up their minds that the directors and superintendent must be turned out as a matter of expediency, although they admitted there was nothing wrong to be said of any of them. This obnoxious clause (No. 5) in the committee's report they were obliged after hard fighting to strike out, and the last dying kick of the official life of these three gentlemen of the committee, backed up by eight others, was to order that I must not be sent back to manage the property. Remember, this is the act of 11 shareholders out of 450 who constitute the company, and against the wish of the directors and other shareholders present, there being but about 18 shareholders at the meeting.

I had already sent in my resignation at the end of the year, but at the earnest request of the directors withdrew it, leaving the matter in their hands.

Mr. Bennett charges that by my method of smelting 50 to 75 per cent. would be lost of the lead, and that the ore treated by me were only 35 per cent. in lead. Had this been true, it would have required 7 tons of ore to produce 1 ton of bullion, and I would have had to smelt nearly 4000 tons of ore to produce the 538 tons of bullion sold, instead of 1504 tons of ore, which is the correct amount reduced. He had the true facts before him in my report, where he could have seen that the average of the ore smelted was 45 per cent. That 1504 tons was reduced, from which 538 tons of bullion was made, and that 80 per cent. of the lead was obtained, all of which are matters of daily record at the company's works by the company's clerks there, and duly reported to the directors, from which the report was made, and not by haphazard statements as made by Mr. Bennett, of a most absurd and ridiculous character.

As to my knowledge of smelting, &c., of which Mr. Bennett claims to have proved I possessed none, I shall have something to say in my next on that and many other points connected with the Utah and Mr. Bennett, as also on Mr. Taylor's statement, that "Americans know nothing of lead smelting, he being so informed by Mr. F. Drake of the Eberhardt."

Your correspondent, "Shareholder," questions "If I wrote my report to the directors," and says I "spent 11,000£. in useless experiments, and that there was nothing to show for it." To this I have to say that nothing but the most unfair prejudice towards me could have instigated such conclusions from any sane man in the face of the facts before him. My "experiments," as he calls the smelting of a most refractory ore, did not cost 11,000£., nor 12 of the working capital, as there was a profit made for ores smelted of \$8331; and for the 11,000£., he has from 1500 to 1600 ft. of development on the property, by which its character is well proven, with hoisting works and working shaft, which cost nearly one-half of that sum, with several thousand tons of ore proven to exist, where 1 ton could not be relied on when I took charge. As to my writing my report, I can only say I use no man's brains in doing work of that character. I did write it, Mr. Shareholder; and before I am done with this subject I shall write some more, which will require much explanation at the hands of "Shareholder" and his partisans to set them right (if that is possible) before the mining public of London. In my next I intend to answer other remarks made by these gentlemen,

when it will be seen that I was from the first opposed to smelting the ores up in the mountains, or building of furnaces there. I will also give the proof that no men could have tried harder, or in a more honorable and honest way, to second my most earnest endeavour to bring the property round to a paying basis, which we were on the eve of doing, than did those same directors who the committee of three proposed to displace.

JOHN R. MURPHY.

#### CLIFTON MINING COMPANY, COLORADO.

SIR.—Your correspondents, John Johns and H. B. Grose, in the Supplement to the Journal of Jan. 4, have made such statements that I think I should be wanting in duty not to notice them. The first general impression conveyed by their writings is antagonistic to Colorado as a mining country. It is so absurd to enter on an argument on this point, since Colorado has been admitted to have exhibited at the Paris Exposition of 1867 "the finest lot of specimens ever produced," that I shall not touch the subject; but the ignorant, ill-judged, venomous remarks in reference to the Clifton Mine require some comment to be made.

One says "The mine is poor, and unless the lead ore can be turned to account I fear there is little chance of its ever paying the expense of working." This sentence alone shows the ignorance of the writer in regard to the nature of the mine. While it is quite true that if the lead were made profitable it would be a great gain to the company, it is equally true that if there was no lead in the mine it would pay handsome dividends. Does he know that an offer for the ore on the ground has been made, which, although not half its value, would be a profit over its production? Does he know that the reports in reference to the mine from (nearly) all sources, interested and disinterested, are exceedingly favourable, and much more encouraging than those upon which the mine was sold to the present company? In fact, what does he know? Why should he draw a comparison between "the Clifton," a silver mine consisting of nearly a mile in length of continuous lode, and about double as much contiguous, and "the Champion," a gold mine of some 600 or 800 ft. length?—especially when he infers that the difficulties of the latter property would be covered by the company buying another 100 ft. Your correspondent, "John Johns (late of Cornwall)," says: "I have worked in the Clifton Mine from the commencement, and know everything respecting it." If (as he signs himself) late from Cornwall, he could not have been working in the Clifton Mine since the commencement, which he probably does not know the date of.

In conclusion, I will only say the letter is only intended to leave an untrue impression on the minds of your readers.

ONE WHO KNOWS.

#### THE ROCKY MOUNTAIN MINING BUREAU OF COLORADO.

SIR.—Your attention is invited to the following extract from the United States Mining Law of May 10, 1872:

Sec. 5.—On each claim located after the passage of this Act, and until a patent shall have been issued therefor, not less than \$100 worth of labour shall be performed, or improvements made, during each year. On all claims located prior to the passage of this Act, \$10 worth of labour shall be performed, or improvements made, each year for each 100 ft. in length along the vein, until a patent shall have been issued therefor; but where such claims are held in common such expenditure may be made upon any one claim; and upon a failure to comply with these conditions the claim or mine upon which such failure occurred shall be open to re-location in the same manner as if no location of the same had ever been made.

You will see that under this law, on and after May 10, 1873, all mines in the United States will be open to re-location—that is, the right of present owners be forfeited—unless a certain amount of labour be performed, or improvements made, upon each mining claim prior to the last-named date—provided, however, a United States patent shall not have been applied for, or issued, for such claim or claims.

One purpose for which this Bureau was formed is that of protecting the interests of non-resident mineowners under this new law. The Bureau is now prepared to direct and apply the necessary amount of labour or improvements upon mining claims anywhere in Colorado, in accordance with the requirements of the law. It also has facilities for securing United States patents to Colorado mines with promptness, and at reasonable rates. The requisite fees, &c., for procuring patents will be advanced by the Bureau for responsible parties, if desired.

FOSTER NICHOLS, Secretary.

Central City, Colorado, Dec. 4.

#### N. ENNOR ON LEAD AND TIN SMELTING—No. I.

SIR.—Having finished my last on dressing contaminated ores, I now notice the remarks of three or four on stamping rough and fine. To me it really appears that these writers are interested or forgetful, and do not know what they read. After this letter I will, in reply, remark as to what I have written. I promise now to take up tin smelting, and after a few brief remarks ask smelters a few questions on smelting.

I know a little of lead mining and smelting. I had lead dressing under my eye for over 30 years, and made slime pits and filled them, but I never took the trouble to claim the contents of one. I might have made a mistake in not doing so, but in productive mines, from which I paid handsome yearly dividends, I left the slime pits full, and the vast heaps have since been slightly handled over, but no one made a fortune from them. But the slime, odd as it may appear, they never touched, and the mine is again being worked. I wanted building sand, and asked them to allow me to take it from my former slime pits. I obtained leave, and carted off many loads. A great deal of it remained, which had been there 40 years. I am not aware that they have attempted to take lead from what is left. I never had a buddle or a slime-frame on the mine.

At Pentire Glase Mine, when it was making large returns, it had a large pile of brickwork. Skimpings from such ores are now crushed by rowles, which is one and the same as skimpings. I asked the captain and dresser what they intended doing with it; they said, "Erect a stamps, and stamp it." I said that the lead would not pay for the stamps. As a trial, I put a boy to jig it, and found they could take out 1 lb. per minute. He took out 1 ton of it, and I found samples, and was offered 9/5. per ton for it, but they persisted in it that it must go to the stamps. I offered the company 100%, and pay the dues, for the heap, but they would not sell it. They erected a stamps, which cost 600\$, and stamped it all, and got 60% for the lead they caught. The sea beach was as blue as a needle with small particles they could not catch, but they never attempted to tell me what became of the lead I had offered 100% for, and they would have it that there were hundreds of pounds worth in it when they commenced. In that case it must have swum out to sea in atoms. This is a strong shade of proof of what does actually go off in atoms. I remember once going out to the Liskeard lead mines with the present Mr. Hawke, of Liskeard, in the evening, and I found I was surrounded by captains from every lead mine around the place, when I told them they were reducing their lead too low, by which they wasted a great deal of it, but they would not have it. I contended that they should, after taking out the rough crop lead, work over all the remainder as rough as possible, take out the crop, and let the remainder go as a second parcel, when they were all down upon me, and fightable. Had not Mr. Hawke and one or two others been there to keep peace it would have been a fight. Then I ask, how long they were before they found out I was right, and made two parcels of their lead? and all the lead miners in the West of England fell in with me. I have often looked at the rivers of lead mines in Wales, and in lead hills in Scotland, and the stream is blue-bottomed for miles.

I was asked a few weeks since, when in Anglesea, by the agent of a North of England lead mine what was the best way to catch slime lead. My answer was to make none worth saving. I may make a few further remarks on lead, as most men know of the expensive lawsuit I had on the Mendip Hills for dirtling the water going to a paper mills (we were over 30 days in Court). To prevent this I had over 20 catch-pits; the water from the last, to the eye, was clear enough to drink, but if you stood on one side in a bright sunny day you could see like small bright stars passing. I then turned the water into a half-acre pond, to filter through, with no other outlet. After the lawsuit was ended there were a few inches of sediment in the pond, and it was thrown out as worthless, to get at what we considered better slime beneath, worth 6 per cent. It soon baked up,

but when rain came we were all surprised, it looked so like lead. We took a sample and assayed it, and it was worth 12 per cent. When put into the pot it all flew off in smoke. We baked it into bricks, and threw it into the flowing-furnace, and there we caught the lead. We even smelted some other slimes, which only produced 6 and 7 per cent. But to get over these points I was for years battling with the smelters before they would touch such lead ore. They said it would destroy their furnaces. I sent off one parcel worth 40 per cent. for lead, but foul with blonde, to a smelting-house in Bristol, and I never got a shilling for it, but I carried my point in the end. Smelters will now jump at any contaminated ore with only from 10 to 15 per cent. of lead in it.

All my remarks go to prove it is bad policy to reduce lead or tin too low, and shows the quantity which goes off in minute particles and atoms. I am quite aware that the tin miner has a battle to fight with the smelters before he will get over them on these points, but I only ask the smelter to lend a helping hand to aid in catching the tin going to sea. This is tin forever lost. The squatters' tin is not lost to the smelter nor to the community; it is only lost to the mine workers, but the smelters must know that it is the youngest and very best of the tin which goes off in atoms; and I know this, that rough contaminated lead in a pot will bring out a better produce than slime lead will, if you mix the same percentage of waste with the slime that the rough lead contains. This I know by practical experience, lead is an evaporating ore in smelting.

I next come to TIN; it does not evaporate to any extent. In that case I ask the smelters what there is to prevent them from smelting tin in the rougher state—say, only worth 50 per cent.? Remember, I am not a bigot on any point, but open. I am not saying I am right. Let me first hear their argument. I ask them all for the good of the nation at large, or I might say the world, to give this their serious consideration to meet me. I will now explain that if you smelt tin at a standard of 50 per cent. the ore must not be stamped at so low a size. Then this will tell upon tin in a fine-grained stone; it will allow it to be stamped one-third larger than the good hitch tin, and would go to the smelting-house in place of going to sea, like Pentire Glase lead did, in atoms.

[To be continued in next week's Journal.]

#### MINERAL RIGHTS IN THE FOREST OF DEAN.

SIR.—Your correspondent, "One who Knows," challenges me to disprove the accuracy of his statements. In the *Mining Journal* of Nov. 30 the report he vouches for states that the Deputy-Gaveller determined to make the grant to Joseph Jones, and this he adds "was done." Now, without disputing his title to the suggestive *alter* your correspondent has thought proper to assume, I have only to refer him to an advertisement inserted by the Crown in the *Forester* newspaper of Jan. 10, announcing the intention to make the grant on Jan. 31; it could hardly, therefore, have been granted as stated.

But your correspondent states, "Now the Deputy-Gaveller determined to make the grant to the new applicant, and the Messrs. Brain were perfectly cognisant of it." Of this there can be no doubt whatever, although at the request of Messrs. Brain a section was brought forward which had been prepared for another purpose by the Deputy-Gaveller himself, and which showed that the depth of the Penswells Iron Mine was even greater than was assumed by the Messrs. Brain, and which clearly demonstrated that the site of Jones's application, as shown by his own witness, Symons, would be drained and covered by the last-mentioned iron mine, the property of the Messrs. Brain—the "formidable appearance" (*sic*) of the "series of seven sections and two plans produced by Messrs. Hoskold and Co. notwithstanding.

In the progressive state of the manner of granting gales in Dean Forest your correspondent's idea of a "geometrical" grant will not, it is to be hoped, be lost sight of at Jermyn-street.

FORESTER.

#### LOSSES IN THE DRESSING OF ORES.

SIR.—I have read, as most of your numerous other readers have no doubt done, the remarks of your correspondents on the loss of tin from those mines bordering on the Red River. It cannot for moment be supposed that the loss of tin from these mines is greater than from other mines, wherever situate, as the methods employed in tin dressing are generally similar at all the mines in this country where tin is produced. It is well to take a dispassionate view of this subject, as the dressing of ores is one of the most important items in mining, both as it relates to costs and the returns. I was forcibly struck with this fact when I first became a mine agent, twenty-two years ago. The *Mining Journal* brings to our notice from time to time some statements of a truly startling character. It appears that about 6000 tons of tin are annually returned from the mines which empty their wash into the Red River, and that one-seventh of the gross proceeds of the mines is estimated to be lost in dressing. Now, one-seventh of 6000 tons would be 857 tons odd, and that, added to 6000 tons, gives 6857 tons as the gross proceeds of the mines, the loss of one-seventh of which amounts to upwards of 9794 tons. If the case rested here, startling as the loss may appear to be, I fear it would be difficult to prove that such a loss was not sustained; and nothing, therefore, would remain to be done in the proper order of events but to devise means by which such a loss might be curtailed. But when to the former is added another representation of the case, showing as before 6000 tons as the annual returns from the mines, but 50,000 per annum as the returns of the workers on the river, which sum would be equal to near 610 tons if dressed to as high a percentage as the crop tin from the mines, making together 6610 tons, being 247 tons less than the former view represented, to compensate for which discrepancy, however, it is stated that a great deal of tin from the mines is carried in solution in the water to the sea, and that the sand along the beach where the river discharges itself into the sea is worth 1/4 per ton for tin.

Now, this being an unqualified statement, upon the authority of a second person, nothing remains to us but to accept it as it stands, or to subject it to a process of investigation by the light of facts or probabilities, as the case may be. If we assume that the proportion of tin saved at the mines is 2 1/2 per cent. of the gross tonnage of tin-stuff reduced at the stamps, then the quantity of sand and slime carried annually down the Red River into the sea cannot be far from 292,500 tons, which at 1/4 per ton would show an equal number—292,500, equal to 3567 tons of tin of the average percentage and money value of that returned at the mines, making, with the quantity returned by the dressers on the river, an aggregate loss of 4277 tons, which would be more than 70 per cent. of the amount saved or of the aggregate amount raised at the mines, independently of the quantity said to be carried off in solution. Thoughts involving doubts forcibly suggest themselves to the mind in view of the foregoing figures and estimates. Is there no exaggeration here, or are not statements made absolute, or only slightly qualified, which should have been highly and emphatically qualified? All exaggeration is unnecessary, and not only so, but will work more harm than good. It would not be necessary to dwell on this part of the subject if all your readers were sufficiently acquainted with mining to draw correct conclusions regarding the matter for themselves; but as this is not the case, and it is important, adversely to the mining interests, that many do believe the statements furnished in the *Mining Journal* in their most unqualified and broadest sense, as they are quoted and made use of in your columns as the basis of remarks—serving as texts for comment, as through they were unquestionable and universally accepted truths. One-seventh of the tin lost would be represented by 14,235 tons per cent. of the quantity saved at the mines, and that is said to be a greater loss than used to be the case in former times—a position which I think will need confirmation, or, at any rate, a qualified explanation.

In the first place, was the tin then disseminated throughout the stone in similar fine particles as it is now? and was the proportion of loss to the ores tested by anyone, if at all, besides the persons who had charge of the stamps, and whose interest it would be to reduce to a minimum the proportion of loss to the quantity saved? If we really lose more tin in dressing now than was formerly the case, our supposed mechanical improvements can only be a delusion and a snare, and our experience retrogressive and bewildering, to say nothing of the waste of money our mistakes have led us into. Instead of progressing we have been retrogressing, and the supposed lights we had flattered ourselves to possess as the acquisition of in-

creased experience by practice and experiment on mining subjects generally, and on this one in particular, has tended only to lead us into still deeper darkness, and to render confusion worse confounded. If this be the case what encouragement can there be to adopt changes which may lead us still further astray, and what assurance can the miner have that other proposed changes may not lead him into still greater errors?—*Liskeard*, Jan. 15.

ROBT. KNAAPP.

#### UNCERTAINTY IN MINING—No. II.

SIR.—Resuming the subject of uncertainty in mining, we may assert that there are no grounds to warrant us in supposing that the cause of the deposition of metalliferous veins is hopelessly involved in obscurity and oblivion. While we do not apprehend that the solution of this difficult and important question is at hand, we believe as our culture increases, and our minds are more directed to the observation and study of such complex phenomena, that a true cause or causes will be discovered, and that our explorations will be influenced and guided by knowledge which is based upon a wider and more accurate foundation than mere observation of indications; that, indeed, we shall direct our operations according to laws which have their assigned place in the economy of nature. We believe also that such an advance in knowledge, and such a desirable accomplishment, is not so remote as may at first sight appear; it may come to us as the outgrowth of a rude guess, or possibly derive its existence from the elaboration of some crude theory: we should not deride or despise any attempt to remove the ambiguity at present associated with so important an industry. Dreamers we have had in abundance, and perhaps in their very dreams some germs of truth have existed, which if examined and investigated might have led to the establishment of general principles.

The citizens of Magna had no conception that the discovery of magnetic rocks in their vicinity would lead to such important results as we now witness by the application of magnetism; nor could the most far-seeing man anticipate the formation of a branch of science so extensive and complete from such an accidental observation: and when Franklin made his kite the winged agent for transmitting and conveying lightning from the clouds to his jars, he had not the most remote idea that he was introducing a means of communicating intelligence which would surpass and exceed the highest expectations. We traverse the sun by the aid of magnetism, and discover unknown lands; and we now make the unruly electric fluid our most trustworthy Post Office official. Such are the effects of two casual occurrences. Now these agents are so intimately associated with our commercial and social wants that we cannot conceive the existence of any civilised community complete without their presence.

We assume there are but few men who will not readily concede the importance and desirability of the object we advocate, and who will only raise objections because of the difficulty connected with it. We admit that the circumstances which surround men's lives are entirely antagonistic to the exercise of calm and dispassionate thought; that the necessities and demands of life, the ceaseless activity and requisition which presses upon all men who have to earn their bread by some form of labour, unfit them for investigations which would seem to require undivided attention. But opposed to this statement may be cited the coincidence that the busiest men have been those who have given to the world the greatest and most valuable thoughts. There is one fact too apparent to be contradicted: it is this, that capitalists who could encourage and aid such a work with the least inconvenience to themselves get really exhibit the greatest indifference towards it, and only aim to reimburse themselves for their outlay. We would remind them, however, that the reaction of this selfish policy falls most heavily upon themselves. They have to bear the loss and disappointment which result from misapplication of capital, and are frequently called to experience to the utmost degree the evils which are contingent upon ignorance. But it will be asked are there no means at our command which will enable us to control or mitigate the loss consequent upon the inseparable connection of uncertainty and mining adventure? We believe that if ordinary attention were given to the causes which ensure success many of the evils would be altogether avoided, or reduced in their intensity and effect.

We will suggest a few remedial measures, which are always under our control, and, although apparently of no moment, perform their share of work in producing disaster and chagrin. We should receive with a large amount of caution and reserve the advice of an inexperienced, incompetent sharebroker. There are many of this class around us—miners of mushroom growth, men who inflated by a temporary success are not content with simply selling and purchasing, which no doubt they are very well able to do, but assume, with unwarrantable assurance, the position of advisers. Impudence is, perhaps, useful sometimes, but always mistrust an impudent sharebroker. Another important thing to remember is not to invest a single farthing in any mine when it is ostensibly held by sharebrokers. However great their pretensions towards legitimate mining, we know it is opposed to the best interests of their vocation to remain content with the quiet and consistent prosecution of an adventure. In the familiar slang of the fraternity, they go in for a swim, meaning thereby the creation of a feverish, unnatural excitement, the creation of false values, and the circulation of misleading and sometimes damaging reports. The promise may be fair, but the issue will be fallacious. These may be thought severe strictures, but are they not true? Sharebroking, as we now know it, is a species of gambling, which escapes, and barely escapes, legal interference. While so conducted, avoid the unclean thing, and seek a channel for the employment of capital which is less dependent upon telegraphic agency.

Closely connected with this suggestion is the proper selection of agents; for we very well know that if certain men did not obtain appointments the designs of not very particular sharebrokers would be frustrated. It does appear most preposterous that, in the face of our boasted moral advancement, our mining industry should be weighted and retarded by agents whose moral delinquency is a by-word and reproach; and yet, perhaps, in no branch of commercial enterprise is integrity so essential; and it is strongly inconsistent with this condition that more men whom it is easy to impeach with defective reputation find their way to positions of trust in this department of trade than any other we could name.

We do not say to counteract this evil select men who are profess-  
ely religious, for many of these are adepts in ceremonial and canting phrases, but real laggards in moral actions, men who are so-  
phisticated enough to pull a long face, but are open to a peculiar  
palmistry. We have these in abundance; they pray well, they  
preach well, but they are fitly represented by that Emperor of  
Russia who after saying grace swallowed Poland. What we want  
are men of tried worth and independence of character, who will  
not readily submit to the dictation of a greedy shareholder, or the  
propositions of a speculative adventurer; men who, confident in  
their ability, are willing to stand or fall by the exercise of know-  
ledge and the practice of honesty, who are sufficiently self-reliant  
to contemptuously spurn the cloak of religion, and the dishonest  
support of unscrupulous dealers, to sustain them in their situations.

But there is another aid we can call into requisition, and that is the uncommon quality of common sense. So long as we hold this faculty in abeyance, so long as we manifest a greedy avidity for rash enterprises, and for schemes which have their only foundation in the active and morbid imagination of some ready-witted promoter of public companies, so long will continue to follow the recurrent train of disappointing circumstances. We may demur, grumble, and abuse to our hearts content, we may blazon our annoyance, and fill the world with our dismal complaints, but as night follows day, with the same orderly and unflinching sequence will come deception and surprise for our implicit faith in schemes which carry upon their face absurdity, dissimulation, and fraud. There are always men waiting to tickle the ears of their fellows with the tale of delusive hope; they are the spiders of humanity, who hide their lurking places and depraved minds by the gossamer tinsel of deceptive wealth. They live by their wits, and prey upon the pecuniary selfishness of mortals. Perhaps there never was a time so marked for the growth and number of foolish enterprises; and true to our past reputation and characteristics we still retain an intense

desire to acquire property which is situated at the furthest distance from our supervision; hence it is that foreign mines, requiring immense capital for their development and prosecution, find a ready and willing public; whilst mines under our noses, with considerable chances of success, and requiring but comparatively little outlay, remain unheeded, or are allowed to fall into the hands of company floaters. We have been curious enough recently to estimate roughly the amount of capital expended in British and foreign mines. Let the figures speak for themselves.

Total capital expended in foreign mines \$5,37,872L, and this in 61 mines, making an average for each of 139,965L. Out of this number three only have paid a dividend.

The total capital spent in English mines is 4,696,017L. This makes an average cost for 244 mines of 19,273L. Twelve of this number have paid dividends.

When we compare the dividend mines in this country with those of abroad the same results are shown. Thus, 83 English mines have paid dividends to the amount of 5,015,711L, or an average of 612,478L; and 32 foreign mines have paid 1,576,314L, or an average of 428,000L. These figures are quoted from the *Mining Journal* up to a recent date in November, 1872. We should have liked to select particular districts, as a further exemplification of the truths we desire to impress upon the public, but we fear we have already trespassed upon your space for the insertion of these remarks; but we cannot conclude without again reiterating the opinion that much of the evil and uncertainty connected with mining is self-imposed by the indifference and disregard we pay to the common and trivial conditions which ensure success.

E. H.

## ROSEWARNE CONSOLS IN THE STANNARIES COURT.

SIR.—Were the world not wrinkled into mature civilisation, as it is, the application of the ever-to-be-remembered "thumb-screws" of inquisitorial celebrity would have long since solved the mystery in which this case is involved. But why reflect on those persuasive powers possessed by our ancestors, whose adaptation of means to ends was perpetually put in force, and seldom failed to extract, particularly in official spheres, responses to their enquiries? It is sufficient for the evil of our day to moot the subject by the mild postulate as to whether the sharp-witted British public will any longer tolerate, and at the same time pay the piper, those "bonnie rigs" to which the worthies of the Stannaries Court are in the habit of capering. The following queries will point the moral:—What was the total amount of debts of the above company when it was put into liquidation? What the amount received from the sale of machinery? To whose credit such sum was paid, and when and where? Further, would it be too much to ask if there be a file of proceedings kept in the Stannaries Court with the, of course unimportant, accessories of date, and so forth? Finally, is this ordinary medium of information for one and all prescribed by Royal Charter open to the inspection of enterprising mortals of the present period? I fear much, however, that enlightenment in this direction will be distinguished by its absence, but allow me to hope some of your readers will be able to supply a few reflections to guide—

AN UNFORTUNATE SHAREHOLDER.

## SOUTH CARN BREA MINING COMPANY.

SIR.—I am not surprised at the remarks I read of "One Kept in the Dark," in the Supplement to last week's *Journal*, and am rather amused at the easy-going way of the London shareholders of allowing themselves to be kept in the dark. You will not find a Redruth man like that—they are like "the early bird that picks the worm." I was a shareholder in South Carn Brea at the commencement, and was well acquainted with the promoter, the late Capt. J. Lyle, and remember his saying to me that he believed it would be one of the best mines he ever saw; and he gave me his reasons; and from the present appearances of the main lodes, as well as the local reports I have gained from working men, Capt. Lyle is likely to be correct in the opinion he so long ago formed, in 1854. "It will take not far from 20 years," says Capt. J. Lyle, "before it will do much." As usual, Londoners have laid out large sums of money in bringing it to the present advantageous position, and I think it is only fair that they should have a share in any triumph.

Cornish men I know are able to work the "oracle" for themselves, and when they get things in "coss" at South Carn Brea it will be done there, then it will be "Hurrah to us, boys." Cornish gentlemen in the neighbourhood of Redruth, Truro, and other parts adjacent to the mine are quietly increasing their holdings. From observation and information I have had on the spot from working men whom I have known for years, I make bold to say to the present shareholders, wherever they are, "Hold on if you can, notwithstanding you may have a small call to pay at the next meeting; don't let that frighten you into selling your shares."

Now and then I take a run down to Cornwall, and have a pipe, &c., with some old fellow-workmen of mine, who are not yet captains, although some of them ought to be from the practical knowledge they possess. Well, like the rest of the bals, and how is this and the other one looking "old boy?" and if you happen to know a keen old dog who winks his eye over a pint, and have a little patience with his style of imparting information, you can pick up a good deal if you know what questions to put. On a visit I have lately paid to the mining district of Redruth I find that it would be wise for all who are interested in Buller, West Basset, South Carn Brea, or West Frances to hold on.

There are a good many who are in the dark I find in these mines, more than the miners when their candles are out, and that they will discover to their chagrin before the end of 1873, unless I am very much mistaken. I am no broker, nor do I wish to be one, there are too many of a sort already, and about Redruth they are of all shades, trades, and denominations. Shareholders should insist on having full and accurate information published in the *Mining Journal* weekly; and I think that if you will urge this in your columns we shall not be long before the number in the dark will be very much less than now.

I say fair play for all, that is our country motto, and I hope it will never be sullied. I have no other reason in now addressing you but a sincere desire to see all who adventure in Cornish mines willing to come forth again after having had luck, saying—"Well, the agents wrote and told the truth to the shareholders, like honest men, and I'll try my luck again."

ONE WHO HAS LOST AND GAINED BY MINING.

## THE GEM TIN MINE.

SIR.—This valuable mine, which is situated near the Grenofen Viaduct of the Tavistock Railway, is opening up well. The stoves in the back of the deep adit level, on the south lode, are worth on an average 30L per fathom; rocks now being broken from the lode weighing from 2 to 3 cwt., containing one-half tin. The north lode also is a very valuable lode, worth for tin from 15L to 20L per fathom; and as the dragee of both these lodes is continued east towards the great elan course the more productive they are. The 20 east and the stoves in this level will average also 30L per fathom. The engine-shaft is now sunk to a 30 ft. level; the dragee both east and west will commence at once, and a splendid course of tin is expected. I am informed that 3000L worth of tin was sold last year, and that the returns this year are expected to pay a profit of at least 50 per cent. on the outlay. No tin mine in Devon or East Cornwall is equal to this mine. There are 14 heads of stamps working day and night, with an abundant supply of water from the River Walkham all the year round. I noticed one of Collom's Patent Bundles on the floor; a very great advantage in the dressing department. I congratulate the adventurers in this very valuable mine.—Jan. 15.

TOURIST.

## NORTH AMERICA GOLD MINING COMPANY.

SIR.—It is, I believe, the invariable custom, previous to the annual general meeting, for the directors of a company to send with their own report to the shareholders the annual report of the manager or agent, showing in detail, in the case of a mining company, the work done during the year, and the cost of it, the number of men employed, the expenditure for materials, stores, &c., and his opinion of the future prospects of the property. It is also the duty of the directors in their first annual report after taking possession of the property to give the shareholders full information in respect of it, whether the shares have all been allotted, the property paid for, and the proportion in cash and in fully-paid shares, the title, and all other particulars which at that stage of the company's progress the shareholders have a right to know.

Directors omitting to afford this information would, I am confident, be universally held to have failed in their duty in very important points, and to have treated their shareholders in a way that no one would justify or excuse; yet such has been the conduct of the directors of the North America Gold Mining Company to their shareholders, for they have neither sent us the annual report of the manager of the mines, nor have they in their own report made the slightest allusion to the amount of the capital subscribed, the validity of the title, the payment for the mines, nor to anything, in short, which the shareholders are as much entitled to know as their paid trustees—the directors.

It may be supposed, however, that the information thus irregularly (though I admit consistently) withheld by the directors was supplied at the meeting by the gentleman who had just returned from the mines with a favourable report, and been made Chairman (in the room of Mr. McCulloch Torrens, M.P., resigned). I have carefully read that gentleman's statement at the meeting, and it amounts to this, that he visited the mines with two friends, and saw three pieces of gold taken from the breast works, obtained from three samples of the gravel of 50 to 60 lbs. each,  $\frac{1}{2}$  oz., 1 oz., and  $1\frac{1}{2}$  oz. of gold; that he entered the lower tunnel where there is a large space of ground to work on, but no miners to work it, and that "Mr. Morgan had greatly improved his stores, which were in admirable order." "These (to use Dr. Stoddard's own words) are the material facts we had to place before the meeting" as the result of his visit to the mines, and it is hardly necessary to say that they do not supply any of the important information which is wanting in the directors' report, but which is most of it doubtless contained in Mr. Morgan's annual report, which the directors, with characteristic reserve, have not sent us. Dr. Stoddard tells us that his visit to the mines had the result of largely increasing his holding in it, and that one of his friends had since become a shareholder. As, however, the public confidence has of late been much shaken, especially by a recent case in which it was affirmed in a Court of Justice that the directors of a company had been presented with their qualification shares paid for with the shareholders' money, it

might perhaps have been as well (although of course superfluous in this instance) as tending to restore that confidence, had Dr. Stoddard incidentally mentioned that he or his friend had paid for their new holdings the full price of 4L per share. Besides, if the circumstances of these two gentlemen having increased their pecuniary interest in the mines be accepted as a proof of their faith therein, in what light can we view the fact that Mr. Morgan, a mining engineer, a practical miner, and manager of the mines, does not hold a single share in them, nor any one at the mines, or in California? Mr. Morgan, we are further told, has run the tunnel 3000 feet, and put in a siding 1700 feet since (we are left to infer) he assumed the management of the mines in March last. As it has taken Mr. McLean, the energetic and skilful manager of Sweetland Creek Mine, nearly two years to run a tunnel 2000 feet, there is either a great difference in the conditions of the ground tunnelled in the two mines above named, or the North America tunnel referred to by Dr. Stoddard includes the 2500 feet of old tunnel, or the 2000 feet of new tunnel mentioned by Mr. Morgan and Mr. McLean in their reports as "completed" months, nay years, before the North America became the property of the present company. According to Mr. Morgan's statement in his report for 1870 the yard of the old tunnel was capable of holding 50,000 carloads, and the yard of the new tunnel 60,000 loads of gravel. Dr. Stoddard now informs us that there are only 30,000 carloads on the dump, yet that when Mr. Morgan was instructed by the board to keep the gravel he had purchased separate from that he might bring out, he was quite unable to bring out any gravel, because it would have covered up what was already on the dump, so that apparently by some unexplained process the yard has marvellously decreased in size since the date of Mr. Morgan's report of 1870.

Our Chairman also tells us that "the mine is well stored," and that "this explains an item in the accounts which it would have been better if it had been a little more fully explained in the directors' report." Dr. Stoddard, to be accurate, should have said that it is not explained at all, or even alluded to in the report. It merely appears in the balance-sheet thus: "Superintendent of mines, 9019L 2s." without any note or comment whatever, or even date. Dr. Stoddard's own explanation of the item is that on arriving at the mines he found Mr. Morgan moneyless, that he had borrowed \$2000, and mortgaged everything" that on this he (Dr. Stoddard) wrote to the directors to send out as much as they could spare of the working capital, and they at once sent him out \$3000, (\$45,000), and this a few weeks only after he made a profit, as shown by his accounts, of 12000L (\$6000). But we are told that the \$45,000 will be recouped by the 30,000 carloads of gravel on the dump, yet

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separately from that he might bring out, he was quite unable to bring out any gravel, because it would have covered up what was already on the dump, so that apparently by some unexplained process the yard has marvellously decreased in size since the date of Mr. Morgan's report of 1870.

## THE SILBER LIGHT.

During the past two years numerous articles have been published in the *Mining Journal* recording the progress made by Mr. A. M. SILBER in perfecting and introducing his very ingenious inventions connected with the burning of oil for illuminating purposes, the merits of which have now been so extensively recognised that the very general adoption of the Silber light for railway, lighthouse, shipping, and many other purposes, besides those of village, country mansion, and domestic illumination, to which it was at first considered particularly applicable, is now beyond question. The mere fact that Mr. Silber has so thoroughly succeeded in producing a lamp which, even in point of actual cost, can successfully compete with gas at 3s. 9d. per 1000 cubic feet, would alone bring the invention largely into favour; and the invention has the still further recommendation that the care and trouble invariably experienced when illuminating oils are burned in the usual way are entirely avoided, the safety of the light being admitted such as to leave nothing to be desired.

The commercial value of Mr. Silber's inventions having now been as completely demonstrated as the scientific skill displayed in connection with them, an influential company—THE SILBER LIGHT COMPANY—has been incorporated with limited liability, and a capital of 120,000L in shares of 10L each, for the purpose of purchasing the inventor's British patent rights and fully developing the trade to which the inventions cannot fail to give rise. We have already noticed that carriages had been fitted with the new light for the Metropolitan, the Great Eastern, the North London, the London, Chatham and Dover, and the Great Western Railway Companies, and as these have now had from 6 to 12 months experience with the lamps, they have had sufficient time to judge of their merits. The reports are without exception satisfactory, the economy and cleanliness of the lamps being alike remarkable. The certificate of Mr. Myles Fenton, the general manager of the Metropolitan Railway, will suffice as a sample of the whole. He states that the Silber lamps which "have been fitted in one of their trains for about nine months have proved very satisfactory. Perfect lighting is essential on this line, and their experience, so far, has proved that the Silber lamps are the best that they have used both as regards illuminating power and economy," and as concerns the illuminating power, Mr. Fenton's opinion will be readily confirmed by all who have travelled on the line in carriages illuminated on the two systems, for the difference is too striking to escape notice. But perhaps the best evidence that the value of the invention is appreciated by the railway companies which have tested it is that afforded by the fact that orders are now on hand for further supplies.

From the brilliancy and reliability of the Silber light, its adaptability to lighthouse and shipping purposes soon became apparent, and the most favourable anticipations were realised when practical trials were made. His recently completed models for ship-lamps were submitted at the recent competition at Shoeburyness under the direction of the Marine Department of the Board of Trade, and his masthead light, burning colza and mineral sperm, of which the flashing point was 450° Fahr., proved the best. Earle's Shipbuilding Company have been supplied with starboard, port, and masthead lights, for Lord Alfred Paget's yacht, and after giving them a trial, his lordship has written complimenting Mr. Silber on the great success obtained, and giving his opinion that "no ship ought to be without them."

The prospectus of the company does not appear to contain any estimate of profit, which is, no doubt, wise, for companies engaged in working patented inventions the probable profits can scarcely be guessed at, but it will be fresh in the memory of many that only a few months since a patented invention company was formed, and in the course of a few weeks a sale was effected which permitted the return, by way of dividend, of the entire subscribed capital, leaving the business intact, and promising annual dividends almost equally large. In the present case the terms upon which the purchase is made by the company are to a great extent contingent upon profits; he is to receive 25,000L in cash (15,000L on completion of purchase, and 10,000L three months after allotment), and 40,000L in fully-paid shares, not entitled to dividend until after the shareholders have received 10 per cent. dividend, and carried 5400L to the reserve fund annually. Three-fourths of the vendor's shares cannot be sold for two years, and when 10 per cent. per annum dividend has been paid for two consecutive years deferred and ordinary shares rank equal. The subscribing shareholders are thus fully protected.

But, perhaps, the most important feature in judging of the prospects of the concern is the summary of the merits of the invention by Mr. William Valentini, F.C.S., the Principal Demonstrator of Practical Chemistry at the Royal College of Chemistry, who, having been constantly consulted by different parties professionally from the time that the invention was first patented, must understand it almost as perfectly as the inventor himself. Amongst the advantages which he points out, and to which the public will attach particular importance, are the perfect safety of the lamps from risks of explosion, the regulation of the admission of air to the flame in such proportions as to produce the most advantageous combustion by means of air currents thrown into the centre and around the flame, and the production of a light from mineral oils 40 to 50 per cent. cheaper than the same light from coal gas costing 3s. 9d. per 1000 cubic feet. Mr. Silber has constructed his lamps to correspond with all the principal forms of gas lights in general use, and thus secures not only all the facilities for illuminating hitherto supposed to be possessed by gas only, but also the cleanliness and much more than the economy of gas in its application to heating and cooking purposes, with the almost inestimable advantage of the portability of oil. Mr. Silber's cooking apparatus, whether for domestic or military purposes, will become even more extensively known than his lamps, though both are destined to occupy a prominent position in the world of inventive industry.

NEW BLASTING POWDER.—A number of interesting experiments were made with Pudrolyte at the Cauldron Low Limestone Quarries, North Staffordshire, on Saturday. These quarries are situated in the wildest and most secluded part of the Staffordshire Moorlands, and are reached from the Churnet Valley Railway Station by an incline 3 miles long, and running for a large portion of that distance at a gradient of 1 in 12. The working face of the quarry consists of an imposing escarpment, more than a  $\frac{1}{2}$  of a mile across, and varying in height from 100 ft. to 150 ft.

The North Staffordshire Railway Company are the proprietors, and they supply annually to the ironmasters of both extremities of the country, for fluxing purposes, nearly a quarter of a million of tons. The visitors on Saturday included the Duke of Sutherland, Lord Tarbat, Mr. Percy Morris, general manager of the North Staffordshire Railway; Mr. T. W. Dods, Mr. C. Lockhart, and Mr. E. Pamphil, heads of departments; Mr. F. Bishop and Mr. C. J. Homer, Chairmen and managing director of the Chatterley Iron Company; Mr. W. O. Savin, of Oswestry, and Mr. H. E. Taylor, of London, directors of the Patent Safety Blasting Powder Company, who are the patentees of pudrolyte; Mr. J. J. R. Poch, son of the inventor, &c. On the arrival of the company a shot was fired. This shot consisted of 2700 lbs. of ordinary gunpowder deposited in a chamber excavated in the rock more than 30 ft. from the face. The explosion brought down about 10,000 tons of limestone, and left besides several enormous masses apparently tottering and ready to fall. Shots of this power are fired about once a month, and in the present excited state of the iron trade the quantity thus obtained is insufficient to meet the demand. After this the experiments with pudrolyte were proceeded with. A hole 3 ft. deep and 1 in. in diameter was driven into the floor of a terrace of rock, and 3 ft. 8 in. from the perpendicular face. A charge of 19 in. of pudrolyte was fired, with the result that the rock, though not blown out, was fractured in all directions, cracks extending across the face to the breadth of 18 ft. 6 in., and 7 ft. downwards. The lifting force was next tried. A hole 2 ft. 8 in. deep and 1 in. in diameter was driven into the base of a terrace, and charged with 15 in. of pudrolyte. This raised and shattered into many pieces a mass weighing about 8 tons. Five inches of ordinary blasting powder were then inserted in the centre of a loose block of limestone weighing between 7 and 8 tons. The hole was 1 inch in diameter and 18 in. deep. The mass was broken to pieces. Two masses, each weighing about 3 tons, were then charged, one with 1 $\frac{1}{2}$  in. of ordinary powder, and the other with 1 $\frac{1}{2}$  in. of pudrolyte. The stone containing the powder was blown to pieces, while the charge of pudrolyte, owing to imperfect tamping, did not explode. By this time the workmen had allowed it to appear that in the matter of blasting-powder they were staunch conservatives, and the failure of the pudrolyte in this case, the charge merely going off with a fizz, was received with derisive laughter. Two other lifting experiments were then made with the pudrolyte, and they were quite successful, but not more successful, the quarrymen said, than gunpowder would have been. The non-explosive nature of the new substance when not confined was then demonstrated. Small heaps were placed upon the ground, and it was found that

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AN UNFORTUNATE SHAREHOLDER.

ROSEWARNE CONSOLS IN THE STANNARIES COURT.

SIR.—Were the world not wrinkled into mature civilisation, as it is, the application of the ever-to-be-remembered "thumb-screws" of inquisitorial celebrity would have long since solved the mystery in which this case is involved. But why reflect on those persuasive powers possessed by our ancestors, whose adaptation of means to ends was perpetually put in force, and seldom failed to extract, particularly in official spheres, responses to their enquiries? It is sufficient for the evil of our day to moot the subject by the mild postulate as to whether the sharp-witted British public will any longer tolerate, and at the same time pay the piper, those "bonnie rigs" to which the worthies

these could not be lighted with the flame of a lucifer match, but it was necessary to thrust into the heap a lighted fusee. It then burnt away slowly, like very damp gunpowder. A quantity of the powder was afterwards placed upon an anvil and beaten with a sledge-hammer, but it did not explode. The finest experiment of this kind, however, was that which closed the trials. A large fire was made in an iron stand, and in the midst of the fire was placed a deal box containing 25 lbs. of gunpowder. At the end of 10 minutes the fire reached the gunpowder, and it blazed up suddenly, but with so little of explosive force that the deal box, although burnt to a mere shell, retained its original shape. The experts present were divided in opinion as to the merits of gunpowder for blasting purposes. In this respect it had not shown itself to possess a very decided superiority to ordinary powder, but its advocates contended that the trials had been made under unfavourable conditions. It was generally admitted that its safety from explosion by accidental ignition or concussion had been established, and its superiority for mining purposes was shown in so far that it gives out very little smoke, and by the general absence of flame on explosion would greatly reduce the liability to the ignition of inflammable gases.

## Meetings of Public Companies.

### MEETING OF THE HONDURAS BONDHOLDERS.

A meeting of the Honduras Bondholders was called by Captain Bedford Pim, R.N., the Special Commissioner of Honduras, to be held on Jan. 6, but on account of the illness of Capt. Pim, it was postponed to Jan. 10, at 2:30 p.m., at the London Tavern, Bishopsgate-street, where a crowded and important assemblage of the bondholders took place. The gallant Captain, we were happy to see, was so far recovered as to be able to take the chair exactly at the appointed time, and gave the meeting the very clear statement we now publish in full detail.

Capt. BEDFORD PIM, upon entering the room, was received with cheers, and after taking the chair, proceeded to deliver the following speech:—

GENTLEMEN.—I appear before you to-day to give an account of my stewardship as Special Commissioner of Honduras, and in order to make my statement as clear as possible to everyone, I shall divide what I have to say in two parts: the first comprising an account of the present actual position of Honduras and the bondholders, and the second, my individual participation in the events which have happened since our meeting in the summer of last year.

I can safely say that my bitter disappointment and grief at having to announce to you that neither coupon nor drawing is at present forthcoming is not second to that of any bondholder present, but that this misfortune has arisen in a manner nobody could have foreseen will be abundantly proved to you presently. The only comfort I can give you at present is the assurance that it has never entered the heads of those in authority in Honduras to repudiate their National Debt; on the contrary, I can assert, without fear of contradiction, that every exertion has been made to fulfil the financial obligations of the State, and complete the Inter-Oceanic Railway, upon which the hopes of both natives and bondholders are so intimately bound up. I firmly believe that every penny of the indebtedness of Honduras will be discharged if only time is given, and if I did not so believe I would not retain the appointment of Special Commissioner for one single moment; and here I feel it my duty to you, in proof of what I have just said, to inform you that all the loans have been raised for the sole purpose of building the Inter-Oceanic Railway, and that, so far as I can understand figures, the Government of Honduras positively have used only the very smallest percentage of those loans for any other purpose but the railway from 1867 to the present day, a period of five years. If anyone wants a better proof of the singleness of purpose and honesty of the Honduras Government, I can only say he is very unreasonable.

Gentlemen, I have received letters without number from bondholders: I have not answered any of them, because I feel that I owed a duty to the general body, and not to individuals. Verbally, I have spared no pains during the last six months to afford every information to enquiring bondholders who have waited upon me personally. I make this statement because I should be very sorry if any bondholder thought me unfeeling because I did not answer his letter. These letters from bondholders contain every sort of question bearing upon the matter now before us which it is possible to conceive, and I think it will, perhaps, be the wisest course for me to adopt if I take those questions *scrutinum*, and give a reply to each.

I need not say that if anyone has any other questions relevant to Honduras to ask I shall gladly answer them.

The following are the questions I refer to:—

1.—Question: Can you state that the money of bondholders has been expended with judgment and due economy?—Answer: The money has been expended in the only possible way, viz.—

1.—In prosecuting the railway works so far as the internal dissensions of the country would permit.

2.—In providing the coupons and drawing of the bondholders.

2.—Question: Supposing the present Government to be upset, is there any succeeding Government likely to repudiate the existing debts, or to fail to pay dividends punctually?—Answer: Repudiation under any circumstances is most unlikely, as is proved by the consistent desire on the part of those in power, of all shades of politics, to finish the Inter-Oceanic Railway.

3.—Question: Supposing there is money enough, and no political interruption, when do you expect the railway finished?—Answer: Within about two years.

4.—Question: Is there enough money to finish the railway?—Answer: Certainly not.

5.—Question: Are you a bondholder yourself?—Answer: Certainly not. I have never held a bond, and never made or lost a single shilling in Honduras stock.

6.—Question: Is there a prospect of peace in the country?—Answer: There is a fair prospect of peace in the country; but upon this point Dr. Bernhard, a commissioner, who has arrived within the last few days from Honduras, will be able to give you the latest information.

7.—Question: What has become of the difference between the amount realised on the sale of the bonds and the actual amount paid to the contractors for the railway?—Answer: I am sorry to say that the money referred to has been paid away in drawings and coupons, instead of being devoted to the purposes of the railway, during the valuable time lost in revolutions and the war between Salvador with Guatemala against Honduras.

8.—Question: What amount of money has been paid to the contractors of the railway on account of works?—Answer: Not very far from one million of pounds sterling.

9.—Question: What amount of money has been spent actually in providing interest and sinking-fund for the bondholders?—Answer: Close upon two millions sterling.

10.—Question: What amount of mahogany or silver ore has ever been imported into this country in accordance with the prospectuses?—Answer: The mahogany and silver ore were actually exported from Honduras at a loss, for the simple reason that the distressed state of the country rendered the bringing of each product to market so much more expensive than formerly, owing to the almost total absence of labour.

11.—Question: Is it true that many formidable engineering difficulties will be met with on the second and third sections of the line of railway?—Answer: I cannot answer this positively from my own experience, because I have not examined the line practically; but every authority who has done so agree that the remaining portion of the railway can be constructed within a reasonable time without meeting more than the ordinary engineering difficulties.

12.—Question: From your great and extended experience of Central America, do you think that, when the railroad is finished, it will be as paying a concern as the Panama Railway?—Answer: So far as I am concerned, I am decidedly of opinion that the Honduras Inter-Oceanic Railway will prove a much better permanent investment than the Panama Railway itself; and I am strongly confirmed in this opinion by my friend, Mr. George B. Kerferd, Consul of Honduras at Liverpool, whose experience of more than a quarter of a century of the commerce of Spanish America renders his opinion peculiarly trustworthy and valuable.

These questions comprise the pith of the enquiries made of me from time to time; but I repeat that, should any gentleman present wish to ask any further questions, every opportunity will be afforded him. I want, however, to point out that, after an experience of six months of careful enquiries and consideration into the affairs of Honduras, I have convinced myself that no enterprise such as the Inter-Oceanic Railway has ever met with such a series of unfortunate and absolutely unforeseen drawbacks as this has, and that this is the real, sole, and only cause of the disappointment of those I now see around me—a cause which will be removed by the continuance of peace in Honduras, on which the commissioner direct from Honduras will shortly give you his views.

I think I also ought to draw your attention to this fact that the operations in Europe of financing the various loans have been rendered more than usually difficult and expensive by the occurrence of no less than two wars almost within that period, to say nothing of the financial panic of 1868, all of which made it peculiarly difficult to raise the necessary funds; and then, when the funds with great difficulty were obtained, the greater portion has been swallowed up in paying interest and drawings, instead of being devoted to the railway, simply because the internal discord of the Republic put a summary stop to public works.

And now, gentlemen, the painful task devolves upon me of detailing to you, in the most succinct manner, the events which have occurred since my meeting you in this same room in the summer of last year. I will not enlarge upon the strenuous exertions which I have made to arrange financially for meeting the obligations of Honduras and completing the Inter-Oceanic Railway.

I do not take any credit, but I feel proud to state to you that I have been over to the Continent no less than 10 times on your business, and that after great trouble and anxiety, it was finally arranged to issue a loan in France, from the proceeds of which the coupon and drawing might be paid, and the works of the Inter-Oceanic Railway be vigorously prosecuted. The arrangements, under the best auspices which could be obtained in Paris, were completed, the necessary formalities with the French Government were concluded, and the loan brought out in Paris and the provinces at very great expense, and as was afterwards proved, with a success which exceeded the most sanguine anticipations. But the well-founded hopes which I ventured to express to you in my circular of Dec. 12 last were not destined to be realised. Monsieur Victor Herran, Minister Plenipotentiary of Honduras in Paris, and his son-in-law, Monsieur Eugene Pelletier, Consul-General of Honduras in Paris, from motives the baseness of which I will not condone to enlarge upon, having failed to extort from me through the Honduras bankers in Paris the sum of 40,000, and 16,000, respectively, laid an information before the French authorities that I had falsely assumed the title of Special Commissioner, and intended to swindle the French public out of the proceeds of the loan.

These assertions, however transparently ridiculous, had upon me a most serious effect. I was summarily arrested at my hotel without the slightest intimation upon what grounds, lodged in the cells like a common felon, dragged before the judge twice with a chain round my wrist, and incarcerated for 46 hours under circumstances which I disdain to excite your feelings by narrating. I will not enlarge upon what I had to endure; but, fortunately, documents seized by the police testified to the baseness, the cowardice, and the deliberate falsehood of Messrs. Herran and Pelletier. Gentlemen, it is my duty to tell you that two more consummate scoundrels it has never been my misfortune to meet with. You will hardly believe that when the Commissioner of Honduras (Dr. Bernhard) called upon Monsieur Victor Herran, on Dec. 27, and asked him where Capt. Bedford Pim could be found, that he replied Capt. Bedford Pim was in London, although he well knew that at that very moment, at his own instance, Capt. Bedford Pim was incarcerated in the

common cell of a French prison. Not only that, but as a proof that Messrs. Herran and Pelletier were both thoroughly cognisant of every step taken by Don Carlos Gutierrez, the Honduras Minister Plenipotentiary in London, the former, Mons. Herran, sent his son-in-law, M. Pelletier, to Brussels, to Don Carlos, who was at that time delivering his credentials from Guatemala to the King of the Belgians, when M. Pelletier, in the name of M. Herran, declared his entire approval of the steps taken, and after making himself master of the terms of the contract stated in the presence of three witnesses, whose letters are appended, that both himself and his father-in-law would give every possible support to the loan.

Before leaving the painful subject of the baseness of these scoundrels I will quote the following extract from the declaration of M. Seegmann, financial agent of Honduras, on this subject.

This gentleman was arrested at the same time as myself, and, being a Bavarian, was possibly in a more dangerous position than myself, for Paris is still in a state of siege, legal security for person or property can scarcely yet be relied upon. After narrating the particulars of two or three visits paid to him (Mr. Seegmann) at the financial Agency of Honduras, since Dec. 16, he goes on to say:—

I learned nothing from M. Pelletier during the next day. Monday, 23d; only about half-past five, p.m., M. Nouette Delorme gave me notice that he had been informed by M. Francois, Editor of the *Droit* newspaper, that a protest was to be inserted in his paper the next morning. In spite of my great impatience, I thought it my duty to go to M. Pelletier, at his hotel at Paris, to demand explanations from him. M. Pelletier was not in, but Madame Pelletier in his absence thought she could assure me that her husband was a complete stranger to the fact I mentioned. However, I waited nearly three-quarters of an hour for M. Pelletier, and just as I was going away, as seven o'clock struck, M. Pelletier came in and confirmed what his wife had said. Returning home at once, I found M. Nouette Delorme there again, who told me that he had been informed, and that in effect M. Francois had received for his paper a protestation, of which he had not thought it his duty to point out the authorship, but at the same time he had been told to await further orders before inserting it. I immediately returned to M. Pelletier to correct the too great positiveness of my former assertion. M. Pelletier received me most graciously, and repeated to me that he had nothing to do with what might have been done in the *Droit* newspaper; that he had no intention of acting in any way at the present moment, and that he would do nothing without giving me notice. The next morning, Dec. 24, his protest appeared in the *Droit*.

M. Pelletier, whilst the notary was at work on Dec. 24, tried to enter into conversation with me. I let him talk. He said to me among other things—

1.—This can do you no harm. We look on you as an intelligent, faithful treasurer-pymaster, and we are especially anxious that your work in the payment of the coupons should not be interrupted for a moment.

2.—It is lucky for you that the issue cannot take place just now. The Honduras Government would have suffered a disgraceful check, but we will take it up again in six months with every chance of certain success.

A certified copy of the lengthy document from which the above extracts have been taken has been laid before the *Juge d'Instruction*, M. Matthieu de Vienne.

I have now only to remark on the personal part of the subject, that every effort will be made to bring Messrs. Herran and Pelletier to justice. My case will be formally laid before the English Government; the French Government will be officially informed of the conduct of those persons who thus prostitute their diplomatic position to serve their own ends, and it remains to be seen if M. Thiers will ever again receive either of these men, while Don Carlos Gutierrez, my colleague, Mr. Kerferd, as well as myself, have officially laid before the Government of Honduras all the facts, with the view to the immediate dismissal of the two men who have done all in their power to dishonour the country they so unworthily represent. After their dismissal, and when no longer clothed with immunity by their official character, they will have to answer to me for their unmitigated baseness; and, in view of that event, I have already taken the necessary steps to prevent their escape, by employing detectives never to lose sight of either of them.

The letters of Mr. Kerferd and myself to the Government of Honduras, and that of Don Carlos Gutierrez addressed to me, are herewith appended:—

[COPY.]

4. Westminster Chambers, London, S. W., Jan. 1, 1873.

Excellency,—I have the honour to inform your Excellency that after devoting my best energies as Special Commissioner of Honduras for the last six months towards procuring the necessary funds to meet the obligations of Honduras, and complete the Inter-Oceanic Railway, and after a successful issue of a new loan in Paris, the proceeds of which were calculated to effect the immediate object in view, his Excellency Mons. Victor Herran, Minister Plenipotentiary of Honduras in Paris, assisted by his son-in-law, Mons. Eugene Pelletier, Consul-General of Honduras in Paris, caused such protestations and false informations to be laid before the French Government as to occasion the forcible withdrawal of the new loan, at the same time subjecting me to the treatment of a common felon. The motives for this base act are on a par with the baseness of the act itself, but by the enclosed documents your Excellency will be made aware of the dastardly means by which M. Herran and M. Pelletier endeavoured to accomplish their ends.

Fortunately, being well known, and holding a good position, the ambassador of England was soon able to satisfy the French authorities of my *bona fides*. But I shall not at present trouble your Excellency with any details of the sufferings and indignity to which I have been subjected, but rather most earnestly draw your attention to the disastrous results which have arisen, and must ever arise, to the Government of your Excellency by retaining such unworthy representatives in Paris. In fact, as your respected representative in London, Don Carlos Gutierrez, will inform you, it is absolutely necessary that M. Herran and M. Pelletier be at once dismissed, in vindication of the honour of Honduras, rather than wait until the Government of the country to which they are accredited—France itself—declines to receive them. I think it my duty to inform your Excellency, without loss of time, of this occurrence, although I cannot enter fully into the details, as there is not time before the mail starts, but I shall lay the whole subject before your Excellency by the next mail.

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As you are well aware, for some time past I have endeavoured to secure the cooperation and to act conjointly in all Honduras matters with my colleague, Senor Don Victor Herran, Minister of the Republic in Paris. To this end, as you know, the loan contract celebrated with you and Mr. George B. Kerferd, the 3d of December last, I stipulated that said contract should also be approved and signed by Mr. Herran, and requested you to see him immediately on the subject.

To secure Mr. Herran's co-operation, I wrote to him on Dec. 1 and Dec. 3 last, the private letters of which I enclose herewith correct translations.

Mr. Herran did not think proper to answer my letters in writing, but on Dec. 5 M. Eugene Pelletier, his son-in-law, and Consul-General of Honduras in Paris, called upon me at the Hotel Belle Vue, Brussels, where I was staying. There, and in the presence of the Rev. James Conolly, Clerk of the Catholic Church of "Our Lady," Kentish Town; of Mr. Frank A. Morris; and Mr. Charles F. Denny, he (2) informed me on the part of Mr. Herran that he (Mr. Herran) had received instructions from the Honduras Government to confine himself to diplomatic affairs, and not to mix himself in financial matters, and that in consequence of said instructions, he could neither approve nor disapprove officially the above-mentioned contract. M. Pelletier, however, added on the part of Mr. Herran that he was willing to do his utmost in his extra-official capacity, both in Europe and in Honduras, to aid the success of these negotiations for the finishing of the Inter-Oceanic Railway, and fulfilling the Government's financial obligations.

M. Pelletier further added that Mr. Herran considered the steps we were about to take for the issue of the projected loan as the wisest course we could adopt in the present circumstances.

In answer to M. Pelletier, I said, "In view of your declarations, and of the support and aid offered by Mr. Sharp, by Mr. Wynne, both eminent solicitors of London; by Mr. Grisar, by Messrs. Dreyfus, Scheyer, by their own solicitors, and by several other eminent lawyers in business men, and they unanimously declared that the said powers in every respect were perfect, valid, and ample. Regarding this point it is impossible to raise the eighteenth doubt. I am persuaded that when you present these documents to the enlightened French authorities, in whose justice and impartiality I repose the most absolute confidence, they will at once exonerate you from all blame and censure."

Capt. Bedford Pim, Special Commissioner of the Honduras Government, &c.

[TRANSLATION.]

Jan. 1, 1873.

DEAR SIR,—The Supreme Government of the Republic of Honduras will learn with pain and astonishment the cruel hardships to which you have been subjected in Paris, in consequence of the acts of the Consul-General of that Republic in France.

As you are well aware, for some time past I have endeavoured to secure the cooperation and to act conjointly in all Honduras matters with my colleague, Senor Don Victor Herran, Minister of the Republic in Paris. To this end, as you know, the loan contract celebrated with you and Mr. George B. Kerferd, the 3d of December last, I stipulated that said contract should also be approved and signed by Mr. Herran, and requested you to see him immediately on the subject.

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M. Pelletier further added that Mr. Herran considered the steps we were about to take for the issue of the projected loan as the wisest course we could adopt in the present circumstances.

After the unfortunate result of the attempts made in London to raise a loan for the formation of a ship railway and the completion of the Inter-Oceanic line in course of construction, the bondholders in this country began to get uneasy, and to manifest their apprehension that the Supreme Government of Honduras would be unable to make good its promises or to carry out its intentions successfully to an end, and a thousand doubts were expressed of the probable ability of the said Supreme Government to face its engagements or to pay the dividends which would fall due at the end of the year.

In order to reassure these bondholders, it was deemed indispensable that a general meeting of the Honduras bondholders should be convened, and such explanations as appeared advisable offered to them, as the only means of preserving the credit and reputation of the Honduras Government.

To carry this into effect, a man of mark and high social position was required—one whose reputation was sufficiently recognised to enable him to preside at the meeting. It was extremely difficult to find a person who, at the same time, possessed the requisite ability, and fulfilled the other indispensable conditions, and who would undertake so thankless and onerous an office. His Excellency Don Carlos Gutierrez was so fortunate as to secure for the performance of this duty Captain Bedford Pim, a distinguished officer of the British Royal Navy, a man of high social position, and well known in the city. With the above specified object His Excellency Don Carlos Gutierrez conferred on this gentleman the appointment of "Special Commissioner

fully and frankly laid before them. (Cheers.) I hope, however, under the circumstances, that some gentleman in the room will move the resolution.

A BONDHOLDER: Why does not the gentleman who drew it propose it, if he is a large bondholder?—The CHAIRMAN: The gentleman was Mr. Pike—a well-known official of the House of Commons.

A BONDHOLDER: There can be no objection to the motion being proposed from the chair.—Another BONDHOLDER: Is the Chairman a bondholder?

The CHAIRMAN: No; I am not.

A BONDHOLDER: I cannot see how we can do better than have the resolution proposed by the Chairman. He has stated so clearly the reasons why it should be adopted, that it can come from no better quarter. (Cheers.)

The CHAIRMAN: Well, if that is your feeling, I will move the resolution, in the hope that it will be seconded by some bondholder on the other side of the table.

A BONDHOLDER: Why not fix a time when the committee shall make their report? Say in the second week in March?

The CHAIRMAN: No, that is not necessary, a month at the utmost will do. In fact, I think that, if the committee go to work vigorously with the materials which will be at their command, they will be able to present at least a first report in little more than a week or ten days. (Cheers.)

A BONDHOLDER suggested that the committee should consist entirely of bondholders, and of gentlemen who, in that capacity, had a large stake in the concern. They should do nothing that could be made a handle of against them by their enemies, and the larger the stake of the members of the committee in the undertaking the better. (Cheers.)

In reference to a warm and general expression of feeling on the part of the meeting, Captain Pim was about reluctantly to move the resolution, when

The Rev. Mr. FITZGERALD said he would be happy either to propose or second it.

The CHAIRMAN: The gentleman who last rose is Mr. Fitzgerald. At the last meeting he gave me a great deal of trouble, and he has a very large stake in the concern, so that I hope you will hear him. Mr. Fitzgerald, except as a bondholder, is a stranger to me, and if he chooses to propose this I shall be much obliged to him.

Mr. FITZGERALD: If it is your wish, I shall have much pleasure in seconding this resolution. (Cries of "Propose it.") Then I will propose it. (Cheers.) In doing so, gentlemen, I think I am considering your interest as well as my own, for I am sure that nothing will so tend to give public satisfaction or confidence than the fact that a committee of independent bondholders has been appointed, consisting of gentlemen who hold a large stake in the concern. The first duty of that committee will be to report to you at an early meeting what have been the financial arrangements of the Government with respect to these loans. I understand the members of this committee are to have access to all books and papers, and everything connected with the affair, and that it will then be their duty to enquire into the state of the railway as regards the second and third issues. I understand the first section is entirely completed, and in good working order. The committee will have to enquire what time it will take to complete the line, and it will be their duty to recommend to an adjourned meeting what financial arrangement can be made in conjunction with the Minister at St. James's and our friend here, Dr. Bernhard, to raise funds sufficient to complete the railway and pay the bondholders a certain rate of interest. (Cheers.) One word more: in my humble judgment—and I have had some little to do with business—the sooner the resolution is passed, and the gentlemen appointed, the better it will be for all parties interested.

Mr. J. WALKER seconded the resolution. The reasons for its adoption had been so clearly stated by the Chairman and the mover, and so completely commendable to the common sense of all present, that it was quite unnecessary for him to add one word in commendation of the resolution.

The CHAIRMAN: Before putting the resolution to the vote I shall be happy to hear anyone who has any observations to make upon the various questions embraced in this very comprehensive resolution. I can, in all sincerity, assure you that I do not wish for anybody to take anything upon trust. I want you all to go away thoroughly satisfied.

Mr. ROBERTS rose and said he had no objection to the appointment of a committee, but he had some questions to ask. (Cries of "Name, name!" "Are you a bondholder?" and interruption.)

The CHAIRMAN: Pardon me, sir; will you give me your name, in order that I may ascertain from the book before me whether you are entitled to speak?

Mr. ROBERTS: I am a bondholder personally, and I represent relations who also have larger stakes in the concern than myself.

The CHAIRMAN looked at the register; not finding Mr. Roberts's name on the list, he asked him if he really was a bondholder, which he declared he was, amidst such interruption and uproar that made it difficult to gather the purport of his observations. As we understand—

Mr. ROBERTS said: I wish to propose an amendment. (Loud cries of "No, no;" "Order," "Turn him out," &c.) I have a very great objection to any gentlemen being on that committee who are not bondholders, and who, consequently, will not look after our interest. I wish to put this question—Where has the money gone?

Mr. FITZGERALD: That is a question the committee will answer.

Mr. ROBERTS: You say that this railway will pay as well as the Panama; but what does the Panama pay? It pays 1 per cent.; and if this railway only pays the same amount, it will not pay at all. (Cries of "Question," "Time," &c.) I know the country well. I am engaged in commerce, and know as well as possible the cargoes of mahogany brought home here did not pay. (Cries of "Question," and interruption.) Why should they have sent the mahogany from another place than that through which our railway runs? (Renewed cries of "Time," "Sit down," &c.) Gentlemen, I see you are not at all inclined to listen to me to-day; but I will call a meeting myself, and I hope that some of you will attend.

Several BONDHOLDERS: Dr. Bernhard.

Dr. BERNHARD, who on presenting himself in response to the call of the bondholders, was received with cheers, said: I hope, gentlemen, you will excuse me if I speak very bad English, for I am a foreigner. I may not now be able to make myself heard, for I am a little affected in the throat. Capt. Pim has read a letter, which shows that I am sent by the Government to see how the railway can be built, and how things stand here in Europe. The letter read in my name by the Chairman contains the expression of the views of the Honduras Government, which I represent in conjunction with Mr. Gutierrez, the Minister of the Honduras at the Court of St. James's. I left Honduras on Nov. 20. In the previous month of October I saw 20 leagues, or more than 60 miles, of the railway in working order, and trains running every day, while for the second and third sections of the line a great part of the metals are provided. In the place where I live—Tigre Island—there were more than 34 miles of rails stored with locomotives, and everything to commence working when the unfortunate war with Salvador broke out. The materials are there still, and the Government intended to go on with the works at any cost or sacrifice to Honduras. Two years of war it has no money, but it has the produce, and when once the railway is finished, and emigration comes to the country, that can be cultivated by white emigrants, and when emigration begins they would soon see what Honduras prod. I may mention one article of great value that will be forthcoming, and that was copper. There are absolutely mountains of copper, but no roads to bring it down to the coast. I can only repeat that it is the fixed intention of the Government to do all in its power to protect the bondholders, and at the same time to complete the railroad. (Cheers.)

Mr. FITZGERALD: Gentlemen, if you will allow me, I will tell you my impression of what Dr. Bernhard has said. (Cries of "Spoke," &c.) One section of the railway is entirely completed. (Renewed cries of "Spoke," &c.)

Mr. GRIFFITHS: As to the importance of this resolution no two opinions can be entertained. Mr. Fitzgerald has spoken well to the point, and I think we are all agreed a committee should be appointed; but, on the other hand, it is necessary that that committee should have the confidence of the bondholders at large. It seems to me that it would be unwise to limit the number of the committee to nine. Appoint nine, but give them power to add to their number any man of note—any man who will take an interest in and devote himself to the work. Nine is so small a number that there will be a difficulty on occasions in getting a quorum. I, therefore, propose that the words be added to the resolution—"That the committee, though consisting of nine, should have power to add to their numbers."

The CHAIRMAN: Allow me to say that you simply anticipate No. 2 resolution, which is to this effect—that the committee consist of the following gentlemen, with power to add to their number.

The motion was then put, and carried, with three dissentients. The result was received with loud cheers by the meeting.

A BONDHOLDER: Now you have carried your favourite resolution. (Cries of "Shame," "Chair," &c.)

The CHAIRMAN: It is not my favourite resolution. It was not drawn by me. My position is this—I come forward to help the bondholders. I have done so for the last six months, and have no more to do with the loans that have been issued than with that bottle. You must not, therefore, talk about my favourite resolution. You can speak to the second resolution if you like.

Mr. GRIFFITHS: It is rather illogical and ungrammatical to say that the committee shall not exceed nine, and then afterwards say that they shall have power to add to their numbers. However, I agree with, and therefore propose—"That such committee do consist of the following gentlemen, with power to add to their number, and to call for the production of all necessary books, accounts, and papers, and such oral or documentary evidence as they may deem necessary for the thorough prosecution of their enquiries, and that they report from time to time the result of their deliberations to such future meetings of bondholders as they may deem it expedient to call together."

Mr. PICKERING: Mr. Chairman and Gentlemen.—I have much pleasure in assuring that; but, at the same time, with regard to the names of the persons who should form that committee, it appears to me that it would be almost impossible to carry that out at a meeting like this. There are cheers or groans of every observation that is made, and, therefore, it is almost impossible to hear anything that is said. I would, therefore, suggest that some arrangement should be made whereby the Chairman, by putting his office at the disposal of the bondholders, might take the responsibility of appointing the committee himself. (Cries of "No, no.") You cannot appoint a committee here; let the Chairman select from any list you like.

Mr. WHITLEY: Mr. Chairman and Gentlemen.—With pleasure I rise to support the resolution. I am a working man and a bondholder, and represent a body of working men in the West Riding of Yorkshire. I have come all the way to take a report back to them, as we have no less than 5000 of the bonds. I have listened to the remarks that have been made, and I have great pleasure in supporting the resolution. (Loud cheers.)

The resolution was then put, and carried unanimously.

The CHAIRMAN: I beg to announce the resolution is carried unanimously. (Loud cheers.) I wish to add that I have heard what Mr. Whitley, from the West Riding, has said with great pleasure, and if he will send the addresses of the working men bondholders, I shall be happy to forward to each of them a paper containing the report of this meeting.

A BONDHOLDER: We should come to an understanding that no gentleman except those who hold rather a large stake in the undertaking should be on the committee.

Another BONDHOLDER: Say 10,000.

The CHAIRMAN: It strikes me there is not one of you holds 10,000.

A BONDHOLDER: I represent upwards of 20,000 worth of bonds.

The CHAIRMAN: Gentlemen, it seems to me that there are many men who hold only 1000, who have as much brains as those holding 10,000. (Laughter and loud cheers.)—A BONDHOLDER: I propose Mr. William Gill.

Another BONDHOLDER: Who is he?

The BONDHOLDER: He is not only a bondholder of 20,000, but he is a man of plenty of brains, and brains in the right place. (Cheers and laughter.)

Another BONDHOLDER: Before that name is put, I should like to make one or two observations. If you go into the question whether a man has brains and where they are placed, I do not think you will ever come to a satisfactory conclusion. If you do that, it will be a matter of impossibility to come to anything satisfactory. If you go into the question of who has brains and who has bonds, how can you,

because they do not go together in the Honduras Loan? (Laughter and cheers.) It is impossible to discuss that at a meeting of this description. I have heard with painful interest from Capt. Pim a statement of what took place in Paris, and I think that it calls for our sympathy more than anything that I have ever known. I am confident that Capt. Pim will use his best endeavours in the interest of the bondholders, and I therefore propose that the names of the committee be selected by the Chairman. (Loud cheers, and "No, no.")

The CHAIRMAN: I certainly should not undertake the task.

After a rather prolonged and desultory discussion as to the best mode of proceeding with the nomination of the members of the committee,

The CHAIRMAN said he did not wish in the slightest degree to interfere with the full liberty of the bondholders, but he ventured to suggest that, as the railway was an international, as well as an inter-oceanic one—as four nationalities were concerned in it, Honduras, France, England, and the United States—it would be well that American interests should be represented on the committee. Two gentlemen of New York, who occupied high positions, and who were also engineers of great eminence, had been suggested—he meant Mr. Siekles, and Major-General Course, of the United States Engineers. He hoped the suggestion would be fairly considered. (Cheers.)

The election then proceeded, and the following gentlemen were declared by the Chairman to be duly appointed—Messrs. Fitzgerald, Walter Armstrong, J. Higgins, Messrs. Digby Seymour, and Major-General Course.

The BONDHOLDER who nominated Mr. W. Gill said he thought that gentleman had been elected.

The CHAIRMAN said his name had not been put to the meeting, but that it was competent for the committee, acting upon the power granted to them by the resolution, to appoint Mr. Gill, or any other bondholder who might be desirous of serving upon the committee, and who possessed the necessary qualifications. For his part, Mr. Digby Seymour, Q.C., said he had been called upon to propose a resolution. (Prolonged interruption.) The learned gentleman, on resuming, said he should not detain the meeting long, and he did not doubt but that the bondholder at the end of the room would have ample opportunity of speaking to the resolution he had proposed. And he might assure him that, for his part, he would be the first to cheer him and endeavour to obtain from him an audience. And he desired to take this opportunity of expressing the opinion he held, that he did not think that there should be any attempt to silence anyone who desired to address the meeting; but at the same time, and speaking rather for those he represented, connections and friends as well as his own interest, he could not help thinking that it would be eminently desirable for the good of all concerned, if the meeting were to refrain from entering into any lengthened and detailed discussion, which would occupy their time to no benefit, and which was the very province of the committee they had resolved to appoint. Nothing, in his opinion, would prove so injurious to their interests as hastily put questions involving hasty and inconsiderate replies. Now, passing on from that, however, to the resolution which had been put into his hand for submission to the meeting, he might say that the resolution he had to propose was one which appealed at once and directly to the hearts and feelings, and right-minded sympathy of every gentleman and lady in this assembly—it was the presentation of the thanks of the meeting to Capt. Pim. (Loud cheering.) He asked the permission of the meeting to refer briefly to a somewhat personal matter. On entering the room that day he had not had the slightest intention or idea that his name would be proposed as a member of the committee; but when Mr. Fitzgerald thought it his duty to select his name as one of the gentlemen to be appointed to act on behalf of the general body of bondholders, and had made it an appeal to him as a matter of duty to accept such a position, then he hoped that he should be the last man to shrink from any responsibility so conferred. (Hear, hear.)

And having accepted the position by the unanimous voice of the meeting, of a member of that committee, he would pledge them his word that as much time as he could devote, and all the care and attention he could command, should be given to answering and satisfying all the questions which had been put, and which occupied the minds of the bondholders as to the financial position of the Government, and the condition and progress of the railway itself. (Cheers.) Now, the cordial vote of thanks which he was about to propose should be presented to their gallant Chairman, Capt. Bedford Pim, had for its object the tendering of their respectful appreciation of his long and tried services in the interests of the Honduras bondholders—(cheers)—and for expressing their deep confidence and sincere sympathy with him in the late unmerited persecutions he had experienced while engaged in the promotion of their interests. (Prolonged cheers.) Naturally, he (the speaker) had his own views, as a lawyer, on the monstrous pretence under the name—the sacred name—of law, but which was, in fact, the violation of all law, whether domestic or international, which had been suffered in the person of Capt. Pim. But it was not even a question of the view which a lawyer might take of the matter. He rather spoke in the common sentiments of their common humanity when he distinctly affirmed that in the indignities the Chairman had undergone the very first rights of citizenship had been grossly invaded. (Hear, hear.) He did not know what government ruled over Paris at the present moment, nor did he care whether Paris was regarded as being still in a state of siege; but this he knew, that if the col. in command of the city had been as bad as he was, he firmly believed that such a wrong would not pass unavenged and unenforced into. (Loud applause.) He could only hope, in the absence of any action being taken abroad, that the attention of Lord Granville would be called to the indignity and outrage done to Capt. Pim, upon an *ex parte* statement put forward by interested persons, and when, without an opportunity being afforded their worthy Chairman of communicating with his friends so as to obtain his release, he had been sent for two nights into the cold miseries of a Paris dungeon, and had been twice brought before the city magistrates manacled like a common felon. The resolution he held in his hand expressed better than he could, and in more solemn language, that which he believed went direct to the opinions and sympathy of every right-minded person in the room. (Hear, hear.) It was as follows:—"That the cordial thanks of the meeting be and hereby are tendered to Capt. Bedford Pim for his able and courteous conduct in the chair, for his persistent efforts in the bondholders' behalf, and for the full and candid explanation given by him of the recent events in Paris (especially of the unjustifiable proceedings by which his efforts were frustrated when on the eve of being crowned with success), together with the expression of deep confidence and sympathy with him under the sufferings and indignities to which he has been subjected, and of strong indignation for these parties whose interference led to such disastrous results, and who wantonly and deliberately sacrificed the interests of the country."

A BONDHOLDER seconded the resolution.

Mr. CUNNINGHAM, amidst much confusion, addressed the meeting. He concluded his remarks, the point of which was lost in the general clamour, by putting the question to Captain Pim whether he were the authorised agent of the Honduras Government?—The CHAIRMAN replied distinctly in the affirmative. (Cheers.)

The resolution was then put, and carried with acclamation.

On the motion of Mr. POLLARD, seconded by the Rev. Mr. FITZGERALD, the following resolution was unanimously passed—"That it be an instruction to the Committee to just nominate that they should forthwith convey to the Government of Honduras the expression of the conviction of the bondholders that the conduct of Messrs. Herran and Pelletier is such as to call for their immediate dismissal from office, in order to show the bondholders that the Government are resolved to

protect their interests to the fullest extent."

The proceedings, which occupied fully two hours, were then brought to a close.

The following letters refer to the evidence that Messrs. Herran and Pelletier were fully conscious in every respect of Captain Pim's appointment as Special Commissioner, and, in fact, of all his proceedings:

DEAR SIR,—I have been pained and astounded to hear of the indignities recently offered you in Paris, in consequence of your issuing the prospectus of the new loan for the completion of the Honduras Inter-Oceanic Railway.

No one, perhaps, outside the circle of those immediately engaged in the enterprise, knew more about it than myself, owing to the accidental circumstance of my accompanying His Excellency Don Carlos Gutierrez to Brussels, and there becoming acquainted with all the particulars of the projected loan.

It is but just to you that I should mention a few facts of which I have been an eye-witness and an ear-witness, which will corroborate what Senor Gutierrez had said in his *de-patch* to you, dated Jan. 6, 1873, a copy of which is before me.

In the first place I know that Senor Gutierrez not only gave you full powers to prosecute the loan in question, but repeatedly expressed himself to me perfectly confident that your energy and ability would make it a success. Again, I know that the loan contract of Dec. 3, 1872, was signed by Senor Gutierrez, subject to the approval and countersignature of Don Victor Herran, the Honduras Minister Plenipotentiary in Paris.

I can also bear unequivocal testimony to the painstaking, anxious, and I must add, scrupulous, efforts made by Senor Gutierrez, not only by means of letters to Don Victor Herran, but in repeated instructions to yourself by word of mouth and by writing to associate his colleague in Paris in the enterprise; so much so that Senor Gutierrez gave Don Victor Herran full power to modify the conditions of the loan contract as his judgment and prudence should direct, binding himself (Senor Gutierrez) to accept and approve of such modifications.

Moreover, I remember the morning when an interview took place at the Hotel Belle Vue, Brussels, between Senor Gutierrez and M. Pelletier, the son-in-law of Don Victor Herran; M. Pelletier distinctly said in my presence that he was commissioned to declare his father-in-law had no power to take part in issuing the loan. Don Carlos Gutierrez replied that his own powers from the Honduras Government were so ample that he could associate his son-in-law in the undertaking, whereupon M. Pelletier distinctly stated his father-in-law's instructions were to confine himself to diplomatic matters, and not to interfere in financial arrangements.

I also know that Senor Gutierrez would not sign the contract till he was assured of the non official approval of his colleague in Paris. I may also say I never in my experience witnessed any man, in any matter of business, proceeding with more caution and acting with more straightforwardness and integrity than Senor Gutierrez.

No man, I believe, could have discharged more conscientiously the responsible duty that rested on him, and no man in my judgment could have been more solicitous to use every honest effort to protect the interests of the Honduras bondholders, and to save the credit and promote the prosperity of his country.

Captain Bedford Pim, R.N. I am, dear Sir, your truly, J. CONNOLLY.

Redhill, Chelmsford, Jan. 8, 1873.

DEAR SIR,—As I understand that M. Eugene Pelletier, in a protest (which has led to serious results in many ways), has asserted that he was not aware of, and did not co-operate in, your efforts to issue a new Honduras Government Loan in Paris, I feel it my duty to state the following facts:—

On Dec. 5 last I was informed that an amended contract with reference to the said new loan had been signed by His Excellency Don Carlos Gutierrez, the Honduras Minister in London, subject to the approval and joint signature of His Excellency M. Victor Herran, the Honduras Minister in Paris, and I was further informed that M. Victor Herran, although favourable to the means proposed for raising a new loan, declined to sign the contract, on the ground of having had special instructions from his Government (which had not been rescinded) not to interfere in any financial operations, as full power to control and act as was thought best in His Excellency Don Carlos Gutierrez; and I further understood that he was willing to write His Excellency Don Carlos Gutierrez to this effect, but that under the advice of his son-in-law, M. Eugene Pelletier, Consul-General for Honduras in Paris, he thought best to send the latter gentleman, M. Pelletier, to personally communicate the same to His Excellency Don Carlos Gutierrez. Therefore, M. Mori and myself, under your instructions, met M. Pelletier, by appointment the same afternoon, and proceeded with him to Brussels—where he (Don Carlos) was temporarily staying—in order to get

to the future prospects of the mine, and taking into account the locality, the geological position, the lodes traversing the entire length of the set, am of opinion that the shareholders will be handsomely repaid for their outlay." There reports were unanimously adopted.

The balance sheet of the company to Dec. 31 was then read, and also unanimously adopted. The retiring directors, Messrs. Odling and Harcourt, were re-elected.

The meeting having been made special, in order to carry out the proposal of the directors that the capital of the company be increased in order to further develop the undertaking, it was resolved that the share capital of the company shall be, and is hereby, increased to the sum of 30,000, by the creation of 100 new shares of £1 each. It was also resolved, that 1000 of such 3000 new shares be issued and now offered to the shareholders in proportion to the existing shares held by them. A special meeting to confirm these resolutions will be held on Thursday, Jan. 30. A vote of thanks to the Chairman closed the meeting.

## SOUTH CARN BREA MINING COMPANY.

At a meeting of the adventurers held on Monday (Mr. W. Pike in the chair), the accounts showed a debit balance of 1527L. The labour costs for October had been 362L, for November 384L, and for December 403L. The merchants' bills amounted to 792L. The receipts were:—For sale of copper ores, 5500L; for sale of tin ores, 32L, which, with the reduction of dues, made a total of 570L. The balance against the adventurers at the last account was 1527L, and that, with the loss on the past three months' working, made a total deficit of 2400L. The agents report contained the following passages:—

In the 100 fathom level east we have intersected the cross-course and opened on the lode east away from its influence, but, finding the lode poor, we have suspended the driving. We have intersected a second cross-course, in the 130 fathom level east, and we have put out a cross-cut north, and intersected the lode to the east of No. 2 cross-course. So far as we have opened on it yet the lode is unproductive. We have suspended two stopes in the back of the 130, and have now three stopes working, worth 10s. and 10s. per fathom, respectively. In the 140 west we have a very kindly lode, and yielding a little tin. We are forcing on this end, as we have a great extent of whole ground before us. The lode in the engine-shaft below the 150 yields excellent stones of copper ore, and has a very promising appearance. We have not been able to make any great progress in sinking on account of the water. The lode in the 150 end east yields fine stones of tin and some copper, and looks very kindly for a speedy improvement; but we regret to state that the level has not yet reached the profitable ore ground, nor drained the bottom of the 130, as we had hoped it would be now. Owing to the bursting of the H and top door pieces of the plunger lift in the 90 fathom level the engine had to be idle for some considerable time, consequently the bottom of the mine has been full of water. This action to the pumping machinery just at this time—which is said to be the wettest season on record—and the sudden failure of our stopes in the back of the 130 have greatly interfered with our returns. The water, however, is being pumped out as fast as possible, and is nearly as low as the 140 fathom level. In a few days we hope to resume operations in the 150, which we have been, and intend to continue, using the cross-course. Looking at the stopes as being nearly exhausted in the back of the 130, and the bottom of the level, where there is a fine course of ore not being driven, by the 150 as soon as we expected, we are reluctantly obliged to advise the putting in of rods underground, connected with the pumping engine, so as to sink a pump-wire in the ore ground referred to. We purpose putting these rods in the 100 fathom level, and through the winze to the 130, which we can now do, as the stopes east and west of winze are suspended.

It was decided that a call of 6s. per share should be made, and that the purser should be instructed to apply to the lord of the mine for a reduction in the rate of dues, whilst the mine is being worked at a loss. The present dues are 1s-6d. for both tin and copper.

## EAST POOL MINING COMPANY.

The two-monthly meeting was held at the mine on Monday, when Mr. DENNIS presided. The balance-sheet showed an expenditure of 5717L; the labour costs for October being 1885L; for November, 1547L; the merchants' bills, 1744L; moiety of the cost of making an award, and the expenses of the referee and umpire, 19L; and the dues, 31L. The receipts amounted to 6505L, including 1245L for sale of copper ore, 5007L for sale of tin, and 100L for sale of arsenic. The profits on the monthly working were thus 810L, out of which a dividend of 2s. 6d. per share, or 800L, was declared. The remaining 18L, together with a balance of 5L from the last account, were carried forward to the next account. The agents' report was as follows:—

**Jan. 10.—Great Lode:** The 150 is driven east from the engine-shaft 19 fms., and is worth for tin 24 per fathom. The 150, west of engine-shaft, is driven 6s. per fathom, west of the cross-course, and is worth 24 per fathom. The 170 east is the same as the 150 reported. There are seven stopes working in the back of the 150, worth 24 per fathom each stop, and two stopes in the bottom of the same value. The 150 is driven south of Pyrce's lode 4 fms. In this cross-cut we have intersected a lode, which have driven into it at 3 ft.; it is of a promising character, producing low-grade tin-stuff. There are two stopes in the back of the 150, east of the cross-course, and two stopes west, worth 16s. per fathom each stop. **Engine Lode:** A stope in the bottom of the 150, east of Denness's cross-cut, is worth for tin 16s. per fathom. A stope in the back of the 150 is worth for tin 20L per fathom. **South Lode:** The 150 is driven west of the cross-course 15 fms., and is worth for tin and copper 16s. per fathom. The 140 is driven 6 fms. west of the cross-course, and is worth 14 per fathom. The 150 is driven 64 fms. east from the western cross-course. The winze over this end, sinking below the 100 fathom level, is down 18 fms.; the lode is large, and contains a little tin-stuff. There are two stopes in the bottom of the 150, worth 25L per fathom each stop. A winze commenced in the bottom of this level, 23 fms. east of the cross-course, is worth for tin and copper 15L per fathom.—W. S. GARBY (Manager), JOHN MAYNARD, JOHN HOSKING.

The CHAIRMAN mentioned that their term was drawing to a close upon their old lease, and within the last four months they had made application to the lord for a renewal, which they expected to obtain in very favourable conditions. Referring to the appearance of the mine he (the Chairman) said he questioned whether the discovery they had made on the south part was very profitable at present; but looking at the treacherous levels they were driving to get towards it, he hoped it would be of great assistance to them. The 150 and 140 fathom levels and the winze were being sunk with a hope of ventilating the property in store for them, but at the present time they were certainly working on towards that discovery at a disadvantage, while at the same time they were endeavouring to reach it as soon as possible. They were raising as much tin-stuff as they could stamp. Altogether he thought they had a little clear sky ahead of them, which would make them smile again. The agents' report was then adopted, the 2s. 6d. dividend declared, and the attention of Capt. Garby called to the fact that the tin ore was sent to the stamps without, as some of the adventurers considered, being sufficiently broken, after which the business terminated.

## WICKLOW COPPER MINE COMPANY.

A stormy meeting of the proprietors of the Wicklow Copper Mine Company was held on Saturday, for the purpose of considering a reply by the directorate to the report which emanated from the committee of enquiry recently appointed, in which they were charged with mismanaging the concern, "cooking" the accounts, and giving dividends out of a pit in place of out of legitimate earnings. In the reply the board deny wif misrepresentations, but admit that there had been false estimates made as to the quantity of stock (ores, &c.) on hand, upon which erroneous returns the dividends recommended from time to time were struck. The CHAIRMAN, in moving the adoption of the report and statement of accounts for the half year ended Sept. 1, 1872, the consideration of which had been adjourned pending an enquiry into the company's affairs, said they withdrew the passage recommending the payment of a 1s. 6d. dividend, inasmuch as the cash in hand when the report was framed, and then available for the purpose, had since been expended on works, &c. A discussion arose on the proposition, in the course of which members of the shareholders' committee proceeded at great length to justify their allegations, but finally the resolution as proposed by the Chairman, providing against the payment of any dividend this half year, was passed. The re-election of the outgoing directors was contested, and others being nominated in their room, the polling was adjourned till Monday, when the result of the scrutiny was—Messrs. Joshua G. Fennell and Richard Wood Kelly, the outgoing directors, were re-elected. Mr. Arthur Andrews was elected a director in the place of the late Mr. Barnes. Messrs. Joseph Casson and Wm. Archer were elected auditors.

## ST. JOHN DEL REY MINING COMPANY.

A general meeting of shareholders was held at the company's office, Tokenhouse-yard, on Wednesday.—

Mr. R. S. ILLINGWORTH in the Chair.

The SECRETARY read the notice convening the meeting, and the minutes of the previous meeting were read and signed by the Chairman.

The CHAIRMAN regretted that he had to occupy the chair in consequence of Mr. Hookin's absence through illness, which, however, they believed was only temporary. The directors were in hopes that the mail would have arrived that morning, and that they would thus have been furnished with some additional information to furnish to the shareholders, as it was, however, their business would be limited to the confirmation of the resolution passed at the meeting on Dec. 20. He concluded by formally moving its confirmation.

A SHAREHOLDER enquired when the last call of 12L per share would be required. The CHAIRMAN said it would not be wanted before the end of February; they proposed to make it on Feb. 28, and in reply to other enquiries he stated that they could not promise that the present capital would be sufficient, but hoped so. Indeed, the matter had not been discussed by the board; they would have ample funds to go on with for some months, and they hoped by that time the shafts would be through and their difficulties over.

A SHAREHOLDER understood that a great deposit had been found in the shaft, and would be glad to know if it was being worked?

The CHAIRMAN said it was not a formal lode, but an ore deposit, not at present remunerative to work, although it no doubt would be when the shafts were through. They were at present sinking at the rate of 4 fms. per month, and would hereafter increase the speed. The reason that no formal assay had been made was because it was known that at present the deposit was unavailable, and the publication of any assay, which at best would be unreliable, would tend to raise expectations which might not be realized. It was supposed to be worth about 31/2 oint. to the ton, but the only way of fairly testing it was to pass a few hundred tons through the stamps and treat it.

A SHAREHOLDER presumed that if the discovery proved anything material they would cease working the miserable Galia. The CHAIRMAN said they were gradually stopping working them already.

Mr. ILLINGWORTH, jun., who had been at the mines, said they could not at present work the new discovery without interfering with the sinking of the shafts, nor would it at present pay to work it. The new discovery was, however, seen in both shafts, and when they had made further progress they would turn it to ac-

count. It had not been seen in the upper levels. The shaft had at present been sunk 47 ft. in it.

The confirmation of the resolution was then unanimously agreed to, and the proceedings terminated with the usual complimentary vote of thanks to the Chairman.

## PINTO SILVER MINING COMPANY.

A special general meeting has been convened for the purpose of passing a resolution for a voluntarily winding-up of the company. It appears that the directors have been able to save the company's mill and mines from being sold to defray the debt due to the bankers in Nevada, but have not succeeded in raising any further capital for working the mines, although their superintendent and other gentlemen acquainted with the district consider the prospects of the undertaking to be very encouraging; they have, therefore, no resource left but to wind-up the company. This offer is as follows:—That subject to the Pinto Company's mortgage and other debts the new company will give to the Pinto shareholders the choice of one or other of the following options:—1. To receive one fully paid-up £1 share in the new company for every ten shares in the Pinto Company Limited; 2. To receive the same number of £1 shares in the new company as he held in the Pinto Company Limited, or any proportion of that number that he may require, with £10s. certified to the vendor by the new company. The two options are distinct, and shareholders cannot take any benefit under No. 2 if they accept the terms of No. 1. No cash will be paid to the vendor in the new company by the purchasers. The purchase-money will be entirely in shares and debentures, and it is intended to raise a further capital of 25,000L. If this or any sufficient amount be raised the directors of the new company hope that it will not be necessary to call up the £1s. per share, otherwise it will be called up by instalments extending over a considerable period.

**SILVER STAR MINING COMPANY.**—An extraordinary general meeting was held on Wednesday, Mr. Elliot in the chair. The Chairman said the sole business of this meeting was to pass the resolution for winding-up the company. The long-expected report from Prof. Clayton had only just been received, and although he had not yet perused it he hoped it would be of such a nature as would enable the predictions he had put out to be fulfilled, and the other company formed. In that case all the costs incurred by this company would be borne by the new company. The amount incurred was really little more than was usually paid for preliminary expenses. The directors had taken nothing for their twelve months' services, although they had done considerable amount of work. He added that profits were held from nearly the whole of the shareholders entitled to vote. The resolution was put and carried unanimously. Messrs. W. F. Black, J. Davis, and W. Mathias were appointed liquidators, the sum of 100 guineas being voted for their remuneration. A vote of thanks to the Chairman and directors terminated the proceedings.

(For remainder of Foreign Mines see to-day's Journal.)

## VAN MINING COMPANY—MONTHLY REPORT.

**Jan. 15.**—As under, I beg to hand you monthly report and setting list.—Seaham's Shaft: The 3 fathoms stoned below the 60 is completed. The cistern has been fixed and the lift dropped to the 60, and our main rods lengthened 15 fathoms, so that we are now ready to pump from the 60 as soon as the lode is tapped in the cross-cut. The shaft is also cased and divided, and the guide rods for the cage put in; in fact, the shaft is completed to this level. The depth of this shaft from surface is 80 fms., and is at this depth 20 fms. south of the lode; the latter keeps some underlay as it did from the 15 to the 45, but it may probably be a little further, as the deeper we go the lode gets more perpendicular. We shall resume the sinking in about a month's time. We have yet 80 fms. to sink before Seaham's shaft meets the lode, which will make its depth from surface 165 fms. I observe that in the insertion in the *Mining Journal* of my report of Nov. 20 last a misprint occurs. Writing of the 60 cross-cut the *Journal* states:—"The lode has been cut to full width, 4 ft., which should have been"—The lode has been cut to full width? In last *Miner's Journal* a correspondent, writing of Central Van, takes advantage of this misprint, and has based upon it some very erroneous calculations. I have had several applications from our shareholders, enquiring "What is this Central Van?" and "Where is it situated?" The various correspondents writing in the *Mining Journal* represent it as embracing a large portion of ground upon the Van lode, and that the Van workings in that direction will eventually be materially obstructed by the two mines are united, and expressing their surprise that the Van Company ever allowed such a valuable piece of ground to pass into other hands. To these communications I feel called upon, in justice to ourselves, to reply. The only portion of Central Van set within a quarter of a mile of the Van lode, and that the two mines are united, and expressing their surprise that the Van Company ever allowed such a valuable piece of ground to pass into other hands. To these communications I feel called upon, in justice to ourselves, to reply. The only portion of Central Van set within a quarter of a mile of the Van lode, and that the two mines are united, and expressing their surprise that the Van Company ever allowed such a valuable piece of ground to pass into other hands. To these communications I feel called upon, in justice to ourselves, to reply. The only portion of Central Van set within a quarter of a mile of the Van lode, and that the two mines are united, and expressing their surprise that the Van Company ever allowed such a valuable piece of ground to pass into other hands. To these communications I feel called upon, in justice to ourselves, to reply. 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## Royal School of Mines, Jermyn Street.

## MINERALOGY\*—LECTURE VI.

## THE ORES OF IRON.

These substances are, perhaps, amongst all minerals the most important to Englishmen, as contributing so notably to the well-being, not only of our mining districts, but in their various ramifications to the well-being of the whole community. By the ores of iron we mean those mineral substances which contain iron in sufficient quantity to repay the extraction of that metal. There are a very large number of minerals occurring in many different geological formations which contain iron in greater or less quantities, but many of these, though very interesting to the mineralogist, are, nevertheless, from their not occurring on a sufficiently large scale, or with a sufficient degree of purity, not worth the while to work as iron ores. I wish to direct your attention this evening to the more important iron ores, pointing out their most prominent features, together with the districts in which they are found. And we will take them in the order in which they stand as regards their percentage of iron, commencing with the highest—magnetic iron ore. I cannot, however, pass to this without first drawing your attention to the vast importance this group of minerals has with regard to the position of our country. When I tell you that during last year no less than 17,000,000 tons of iron ore were raised in this country you will at once see that it is an industry of the highest scale of social interest. If we look back to a time within the recollection of a great many of us, previous to the Great Exhibition of 1851, and compare the statistics of the production then with that of last year, the extension within that time is something almost fabulous, and surprises even those who are most conversant with the remarkable changes of the last 25 years. And the wonder is not lessened when we learn that the total value of this production, as obtained from the mines, approximates nearly to 8,000,000,000 annually.

The most striking property of the variety of ore with which we have first to deal is that which was known in early time—that of attracting filings of iron or small light bodies in which iron was present, and this property obtained for it (whether from the country where first discovered, or, as some say, from the name of the discoverer) the name of magnetic iron ore, or magnetite; it is found in parts of Sweden, Norway, and the Ural Mountains, and on a much smaller scale in England; it has a greyish black colour, and crystallizes in very different forms in the octahedron; the triangular faces of the crystals may frequently be seen on examining the mass; it also occurs in the rhombic, dodecahedron, and other forms of that system. The crystals are generally minute, but from some places in Northern Italy we get them 3 and 4 in. in diameter. The lecturer then took a magnetic needle, freely balanced, and brought near it a small piece of this kind of ore, when the needle was attracted or repelled according as one or other pole of the mass was presented, and this action occurred at 8 or 10 in. distance from the needle, and also when several thicknesses of paper were interposed. He showed that the magnetic property was not simply due to the large percentage of iron present in the ore (its composition is—iron, 72.4; oxygen, 27.6) by taking a mass of another variety—specular—almost as rich (70 per cent.), and showing that it had no effect upon the needle. Although we need not believe Sinbad's story regarding the rock which drew nails from the ships, there are indications in parts of masses of this rock exerting an influence on objects brought near them. In the south-east corner of Dartmoor, if you pass down a certain road with compass in hand, held even 3 or 4 ft. from the ground, you will see it disturbed and oscillating, and the pole reversed, the fact being that there is a band of magnetic iron ore beneath the surface; and I have been assured by the coasting sailors that there is a spot in Cardigan Bay where a reef of rocks project under the sea, in passing which the compass needle exhibits similar movements. In some parts of Sweden persons carrying with them a peculiar kind of compass, and walking about over the surface, ascertain where the deposits of this mineral lie. Having so high a percentage of iron, it is of very great importance in that manufacture, and as it is of peculiar value for certain kinds of steel, a great trade has been carried on between Sheffield and some parts of Sweden in the iron made from this ore. There is another mode in which iron sometimes occurs, which is more remarkable still, as regards the great proportion of iron in the substance—that known as meteoric iron, cosmical masses which fall from time to time on the earth. Disseminated through the mass are often grains of olivine, and alloyed with it too is nickel, varying commonly in proportion from 1 to 6 or 8 per cent.; but from its rarity this substance cannot be included as an iron ore; it is curious to know that this same material—magnetite—is found amongst the products of Vesuvius, and appears to have been evolved along with other matters in a vapoured condition. The present condition of the substance is probably not its original one as evolved, but that assumed by it on cooling. In the Island of Elba, near a little town called Rio, on its east coast, the rocks on a sunny day seem almost to belong to fairy land, for as you walk over the hills you may see everything glittering like the next variety of ore that I wish to bring before you, that known as specular ore. At the south-east extremity of the same island, Cape Calamita, is a mass of magnetic iron ore, which deranges compasses brought near it, and in consequence of that might not improbably be the means of shipwrecks, or of miscalculation even to those on shore.

Specular iron ore, or red peroxide of iron, has the composition—iron, 70; oxygen, 30. This variety is infinitely more valuable to us in this country than the preceding. In the North of England, especially in the districts of Whitehaven and Furness, we have some of the most remarkable—I think I may say the most remarkable—deposit of this material to be seen in the world. It is also worked very largely near the town of Rio, in the Island of Elba; and its abundance there may be imagined from the fact that the Roman poets mentioned the island in their time as having inexhaustible mines of the best iron ores. It is externally of a bluish-black colour, with sometimes a tinge of brownish-redness about it, or occasionally it has an iridescent film about it, reminding you of the various colours seen in the course of tempering. It crystallizes in the hexagonal system, and, generally speaking, its crystals are rather tubular. In some cases, as in the large specimen exhibited, it is seen in the form of a scalenohedron, with rough faces, causing a suspicion that that is not the real form of the crystal; neither is it, but it is the figure of a crystal of calc-spar, the same series of changes which removed the spar having brought and deposited the iron oxide. Here is a crystal from the gold mines of Brazil, with a lustre so great that one would be almost disposed to believe that it was artificial rather than a natural surface. It is this variety which has gained for the substance the name of specular ore, from its surface being like a looking-glass. The greater bulk of these ores which occur in this country is mammilated, or in a rounded form, and is known as "kidney iron ore." In most cases it has a considerable degree of hardness, especially when freshly broken, and is very free from impurity. These rich red iron ores are distinguished from the first variety by the fact that while the magnetite when ground or scratched gives a black powder, this variety always gives a blood-red powder, and hence its name of hematite, or bloodstone. The quantities produced by some of our northern districts last year was as follows:—Furness, 931,000 tons; Whitehaven, or Cleator Moor, 976,74; the single mine of Hodbarrow, 207,148; giving a total of 2,115,000 tons, which was worth as obtained at the p.m. in round numbers 2,500,000. Englishmen have good reason to be proud of these districts, but we may tremble when we look at some of them, and see their irregular and uncertain character as repositories of these ores. In some of the northern districts professional borers are kept continually at work to discover fresh deposits, which may be worked when the old ones give out. The iron made from this variety of ore is found to be the most suitable for the Bessemer process of making steel. Besides being found in the North of England (notably in the district between Morecambe Bay and Workington) it occurs also at Rio (in the island of Elba), Western Germany, Saxony, and North America, in which latter locality it promises at a future day to support a vast trade in the material. It is only, of course, in selected specimens that the percentage of metal reaches 70, but still in the common ores as brought to the furnace it often averages from 55 to 60 per cent.

The next variety is the brown iron ore, or hydrated oxide of iron, which has a composition when purest—iron, 60; oxygen, 24; water, 14. The water varies in amount, averaging from 10 to 15 per cent. Whatever its external aspect may be, it always gives a brown powder, and this is readily distinguishable from the two preceding varieties. Notwithstanding the comparative inferiority it is a substance of great commercial value. The combined water has to be driven off by a process of calcination, and from this cause the ore requires a larger quantity of fuel than the other varieties. These brown ores occur in a great number of our western mining districts. In the Forest of Dean it occurs in a basin of the carboniferous limestone beds, in irregular cavities, which are worked by galleries driven out from a vertical shaft. From its position in the cavities it is very evident that it has been introduced after the formation of the hollows, in the same manner as the stalactites of carbonate of lime referred to in the second lecture. In this locality, 80,000 to 100,000 tons of this ore have been turned out from a single hollow, or "chimney." In the year 1851 Mr. Blackwell, a public spirited ironmaster, presented 5,000 to this institution to defray the expenses of making a series of analyses of iron ores, the results to be published for the public benefit. He suggested the use of a number of stratified deposits of iron ores found in the counties of Northampton and Bucks, in a geological formation of a later date than those in which the preceding ores occur. And this variety of iron, and these localities will, I think, play a very important part in the iron trade of our country, especially as the better class of ores begin to fall away. These stratified deposits cover many square miles of country, and in many cases are disposed so as to be easily worked.

Another ore is the sparry iron ore, or spathite, which is a carbonate of iron with the composition in the pure state—protoxide of iron, 62; carbonic acid, 38. From its general light colour the miners call it white iron ore. It occurs in very beautiful crystals; here are some rhombohedral crystals of a pale yellow colour, possessing great translucency. It is generally found more or less mixed with carbonates of lime, magnesia, &c., and in some varieties has even been used as a building stone. A peculiar and well known variety of iron—spiegeleisen—is extracted from this ore in Germany. In Styria, in Austria, it has been worked for hundreds of years. A variety of this carbonate mingled with clay is found as rounded mass or nodules in the coal measures, in most cases having about 30 per cent. of metal in their composition. About the origin of these there has been much discussion, and it is a point not yet settled. In Great Britain we are fortunate in having these layers of nodules running parallel with the strata of the coal measures, and it is to this kind of ore that England owes her superior position in the iron trade during the last 100 or 120 years. Some deposits are notably richer than others, but the working in all cases depends in great part upon the depth of the beds, first on account of the greater cost of working with increased depth; and, secondly, because it was then much more difficult to separate the ironstone from the shale; and this will sometimes, as in parts of South Wales, bring the operations to a dead lock. As our own production does not meet our requirements we have to supplement it by importing ores from Elba, Algiers, Bilbao, North America, and other places, and the trade in these ores now carries on between these places and the ports of Newport and Cardiff is considerable. In some cases the ores are brought over as ballast. The clay ironstones when split open sometimes present certain patterns, often filled with crystalline matter, being nothing else than shrinkage cracks, and the crystalline substances have subsequently been infiltrated into the mass.

The town of Middleborough, in Yorkshire, standing where only 24 years ago there was scarcely a house, owes its rise entirely to the discovery of large deposits of iron ores in that locality, now famous as the Cleveland iron ores. The idea of iron ores occurring there in such quantities was at first ridiculed, but now the district

produces 4,500,000 tons of it annually. It occurs in beds, belonging to the geological formation called the lias, and is manufactured by means of the coke brought from the adjoining coal field. These stratified deposits of ore are found in beds which were at one time considered to be out of the mining districts altogether.

Blackband iron ore, which contains the same materials as the above carbonates, mixed with a quantity of coal or carbonaceous matter, was introduced not many years ago into the iron manufacture of Scotland. For a long time it was neglected, but the want of iron ore led to its being employed, and it has proved to be the salvation of the iron trade of those districts. It contains a sufficient proportion of carbon to enable it to be calcined with the addition of very little fuel; and, after being set going with a little coal it will go on burning, and thus drive off the carbonic acid and any water that may be present, bringing it up to the percentage of metal nearly equal to the specular ore.

There is one other mineral which I wish to mention, and it is a very different matter from any of the preceding. It is known as iron pyrites, and in its composition has one part of iron to two of sulphur. Its percentage of metallic iron may be taken roughly as about 47. It crystallizes very beautifully in various forms of the cubic system. Up to about the year 1840 this substance was thrown away as worthless, but attention was directed to it for the sulphur it contained in consequence of the action of the King of Sicily with regard to the exportation of sulphur from that island. Now, from the works on one firm alone entire trains of wagon-loads of a product of the chemical treatment of this material are taken away daily to be smelted as iron ores. They extract from it also a small quantity of copper and a still smaller quantity of silver, which it contains. Wicklow, in Ireland, has produced at times 100,000 tons of pyrites per annum; large quantities are also brought from Huelva, in Spain, and from Portugal.

It is very interesting to find in some cases one of these varieties of ore exhibiting the form of one of the others, thus showing that at one time it existed in that particular form, but that it has since been subjected to influences which have totally changed its chemical character, and showing in some instances evidence of its having passed through several stages of different oxidation.

## MINERAL RESOURCES OF THE TERRITORY OF UTAH.

It is but natural that capitalists interested in the development of the industry of a district should feel some desire to learn the particulars of the history and prospects of the place, and as a very large amount of British capital has been sent to Utah for the working of its mines the issue of a volume\* by one who has had long practical experience in the locality, will be most acceptable at the present time. The author remarks that having had some 18 years' practical experience in the schools of mineralogy and metallurgy, he deems himself qualified to place before the public in a complete and concise form information on a subject which has been hitherto treated superficially and in a disconnected manner. He points out that the discovery of ores of the precious metals in Utah is due to the necessity which arose in 1862 of sending troops to the territory. The Mormon leaders and people had for some years previously assured themselves of the existence of mineral deposits in the mountain ranges which traverse the country from south to north, but the isolated situation of the Mormon settlement, and its great distance from all sources of supply, compelled the inhabitants to give their undivided attention to agriculture and to such manufactures as the exigencies of their situation required. The withdrawal of the military from Camp Floyd, where a formidable post of some 6000 or 8000 men had been kept since the arrival of Johnson's army in 1858, left the territory without any military protection whatever, and emboldened the Indians to such a degree that they became exceedingly troublesome, not only within the settlements of Utah but all along the line of overland travel. Upon the establishment of Camp Douglas in Oct., 1862, the fact that mineral deposits abound soon became known to the command, and military permission was given from time to obtain by squads of the men to go into the mountains and prospect. It was on one of these exploring expeditions that Capt. A. Heitz and party made the first discovery of argenticiferous galena in Bingham canyon. The first smelting furnace in the territory was erected at Stockton in 1864, also by Gen. P. E. Conner. During the summer and fall of 1864 draft furnaces were built by several parties in and around Stockton and Rush Valley. Owing, however, to the obstacles caused by the inaccessibility of the country, high tariffs, &c., the business was abandoned, but not before a large amount of money had been spent in the experiment. The result of these trials proved the fact that the ores were facile of reduction, and could be smelted with advantage by some improvement in the construction of the furnaces and the employment of more practical labour and skilled superintendence.

Free gold was first discovered in Bingham in the year 1864 by a party of old Californians, who, returning from Montana to pass the winter in Salt Lake City, prospected the canyon in the early part of that year. From 1865 to the present time the placers of this anyone have paid good wages regularly, and in some few instances the claims have proved very rich. The first shipment of ore made from the territory was a car load from Bingham canyon, shipped to Baltimore by Walker Brothers, in June, 1868. The first discovery of silver-bearing ore in the Wahsatch range was made in the summer of 1864 by Gen. Conner in Little Cottonwood canyon, and Mountain Lake district was organized, but nothing was done to develop it until the fall of 1868, when operations for the first time of any extent were started on the mines by Messrs. Woodhull, Woodman, Chisholm, Belch, and Company. The first shipment of ore to market having proved a success, work was pushed ahead with the utmost vigour on the mines already discovered, especially on the Flagstaff, Emma, North Star, Savage, Magnet, Monitor, and others. Although free gold has been from time to time discovered in the territory at various points, yet in no place has it been found in quantities sufficient to justify its extraction except in Bingham canyon. Gold placers on the Sevier river, Walker Brothers, in June, 1868. The first discovery of silver-bearing ore in the Wahsatch range was made in the summer of 1864 by Gen. Conner in Little Cottonwood canyon, and Mountain Lake district was organized, but nothing was done to develop it until the fall of 1868, when operations for the first time of any extent were started on the mines by Messrs. Woodhull, Woodman, Chisholm, Belch, and Company. 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## THE PATENT DOWNTAKE BOILER.

Fig. 1.

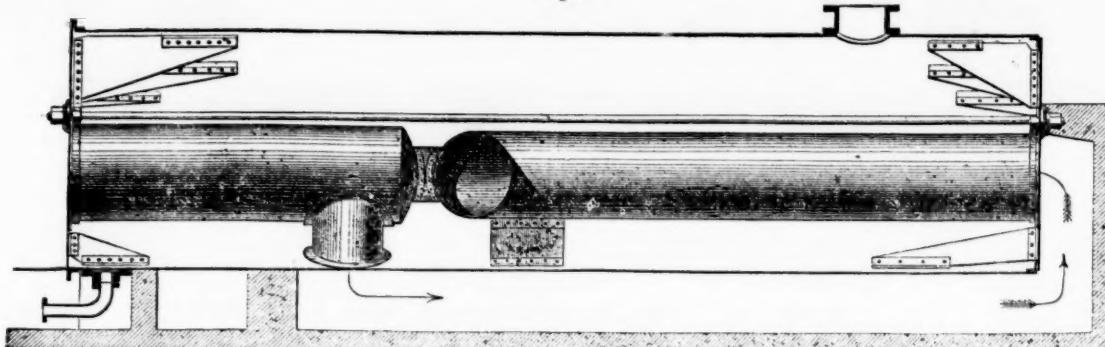


Fig. 2.

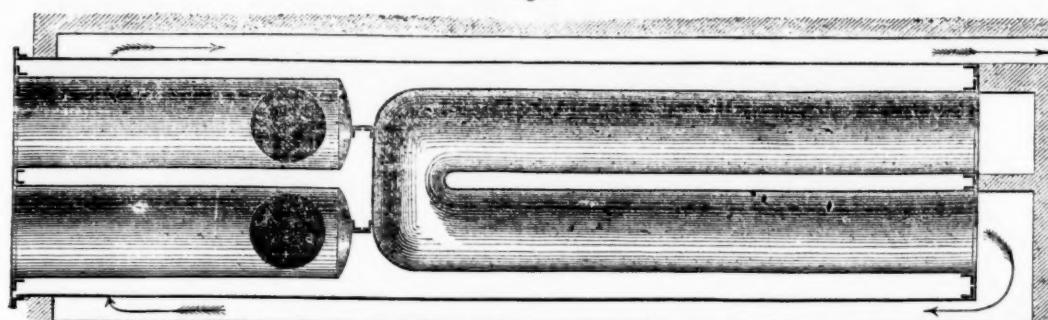


Fig. 3.

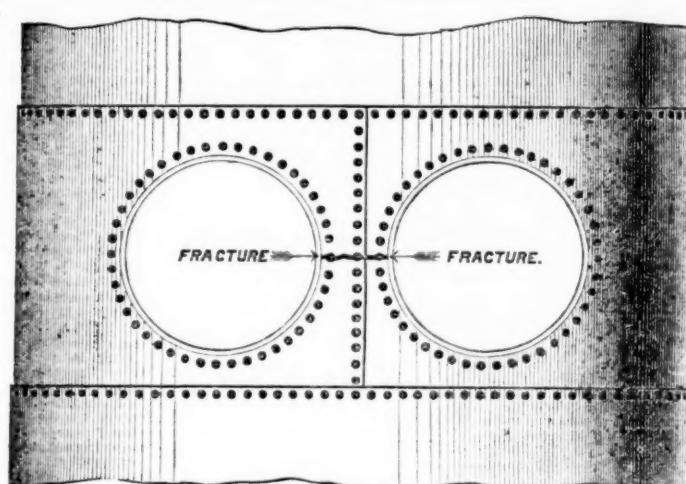
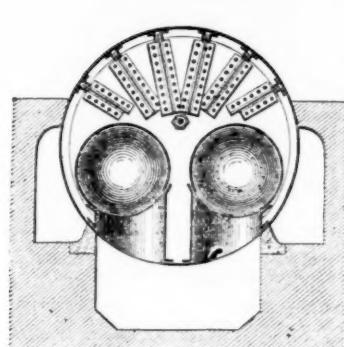


Fig. 4.

## THE PATENT DOWNTAKE BOILER.

In a recent report of the chief engineer of the Manchester Steam Users' Association a few of the many objections to the downtake principle of construction are pointed out. The boiler is an objectionable modification of the Lancashire boiler; like it, it is set horizontally, is cylindrical in the outer shell, is flat ended, and contains a couple of internal furnaces; but it differs in the material point that the furnace tubes instead of running right through from end to end of the boiler scarcely extend half way, and terminate in "downtakes" connected with the bottom of the outer shell, through which holes are cut for the passage of the flames, while the flue tubes instead of being a continuation of the furnace tubes are quite separate and wrought into single flue of horse-shoe shape, having its ends attached to the back end plate. The flames immediately after quitting the furnaces pass through the downtakes to the bottom of the shell, and along underneath it till they reach the back of the boiler, when they enter the horse-shoe shaped flue passing up one side of it and down the other, after which they traverse one side of the external shell from front to back, and then passing underneath it return on the other side from front to back and pass off to the chimney. The course of the flames is tortuous, and the construction generally has serious objections.

In the Lancashire boiler the flue tubes running from one end to the other form most valuable ties, which not only support the flat ends, but also lash together the external shell longitudinally, which is of great importance in the event of rupture at any of the transverse or circumferential seams of rivets. But the loss of longitudinal strength is not the only objection to which these boilers are open. The passage of the flames from the furnaces through the bottom of the external shell necessitates two outlets being cut through it, measuring as much as 2 feet in diameter. These have a very weakening effect, and are opposed to all modern boiler making practice, in which cutting holes in the shells is avoided as much as possible. All the experience the Association has accumulated is decidedly in favour of internal firing rather than external, and, therefore, it cannot approve of the mode in which the downtake boiler is heated. Not only is it complicated and the course of the flues tortuous, but its construction is faulty, inasmuch as, firstly, the furnace and flue tubes are severed, in consequence of which the longitudinal tie they would otherwise afford is lost; secondly, two large openings have to be made in the bottom of the shell for the downtake outlets; and, thirdly, the flames are allowed to act on the bottom of the shell immediately after leaving the furnaces.

In the above diagrams Fig. 1 represents a longitudinal section of the patent downtake boiler; Fig. 2 the plan; and Fig. 3 the transverse section. The remaining figure is an enlarged view showing the fracture at the bottom of the downtakes, which formed one of the dangerous fractures discovered by the officers of the Association. In this case the plate at the bottom of the external shell was found to be completely severed between the two downtakes, which was of the more importance as the shell was already weakened at that part by the large downtake openings. This rent was first discovered on getting up steam on Monday morning. When the steam was raised to a pressure of about 18 lbs. the water was noticed to fall rapidly in the glass water tube, in consequence of which the attendant drew his fires, and on getting into the external flues found that the boiler was leaking, and that the plate between the downtakes had rent as described. When this boiler was first brought out the Association viewed it with considerable suspicion in consequence of its loss of longitudinal strength, the large openings cut in the bottom, and the action of the flames upon the outer shell, and it has not failed to express those views to the members on every suitable opportunity, and, as already stated, to get additional stays put in to meet the difficulty as far as possible. The Association, however, has felt some delicacy, perhaps too much delicacy, in enforcing its own views lest it should unwittingly be impeding trials that might ultimately prove of advantage. It has not, therefore, hitherto felt justified in going further

than warning its members of the danger it considered was attendant on the use of these boilers, and inducing them to put in extra stays, as well as to keep down the pressures. The defects, however, that have manifested themselves in their working, though these boilers are of recent introduction, and thus quite in their prime, show that it is incumbent on the Association to take a firmer stand with regard to them for the members' safety and its own reputation. Those members, therefore, using these downtake boilers must be good enough to understand that they are earnestly recommended to cut out the downtakes and horse-shoe shaped flue tubes, and to introduce in their place straight furnace tubes running right through from one end of the boiler to the other, and also to blank up the large openings at the bottom of the external shells. No course short of this will be permanently satisfactory, and the Association cannot take upon itself, but must leave with the members, the responsibility of any defects that may arise at the bottom of the shells of those boilers in which these patent downtakes and horse-shoe shaped flues are retained.

## COMPRESSING FUEL AND OTHER SUBSTANCES.

Mr. J. LODGE, of the Whitecroft Works, Lydney, has invented some improvements in machinery or apparatus for compressing fuel, clay, and other like substances, which relate to a peculiar combination of machinery intended chiefly for compressing blocks of artificial fuel, but applicable also to the making of compressed bricks or tiles and to the compressing of other substances into blocks. According to this invention it is proposed to combine together in one machine a rotatory horizontal table, provided with a number of openings or moulds for the reception of the fuel or other substance to be compressed, and within which openings or moulds the compressed block is formed. As the table revolves by a step by step ratchet motion the openings or moulds are successively brought accurately over a vertically moving block, which forms the bottom for the time being of the opening or mould. This block is connected to a weighted lever which affords the resistance to the pressure which is applied by a plunger or sliding block worked from an eccentric on an overhead shaft. The degree of pressure may be varied by adjusting the weight along the weighted lever above mentioned. The revolving table is made hollow and connected with steam pipes for the purpose of heating the moulds or openings by surrounding them with steam, whereby breakage from frost or other cause is prevented and a cleaner and nicer block is obtained. After each block of fuel is compressed it is carried round in its mould as the table revolves underneath another plunger or vertical sliding block, also worked from an eccentric, which plunger descends and forces the compressed block downwards on to an endless travelling band below. This band is driven by a ratchet motion, which pauses and allows the band to remain stationary during the time a block is being deposited thereon. In order to prevent injury to the compressed blocks the receiving surface of the said endless band may be covered with wool, sheepskin, or other soft material. A sliding locking bolt, with bevelled or tapered end, is moved forward by a special cam into one of a series of holes or notches made round the rim of the table for the purpose of ensuring the table being brought accurately into a proper position to receive the pressing plunger, and to hold the table firmly whilst the said plunger is at work, whereby accidents to the machine are prevented. The cams and eccentrics are mounted on a separate cam shaft driven by gearing from the crank shaft of the engine, this cam shaft having a fly wheel of its own in addition to the ordinary fly wheel on the crank shaft, whereby extra pressure is obtained.

FUEL.—Mr. M. RAE, of Uphall, Linlithgow, has patented some improvements in the manufacture or preparation of fuel, which consists in the manufacture of fuel from small coal, finely-divided shale, or bituminous "blae," with bituminous mastic, or preparation of crude shale tar, and in a combined apparatus for drying, mixing, and pressing the same.

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CHARGE IN  
SAFETY FUSE  
FIRE TO THE  
BLASTING ROCKS,

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**M. R. WILLIAM ELSAM,** SOLE AGENT,

**8, NAVARINO TERRACE, DALSTON RISE, LONDON,** Who is prepared to FURNISH ALL INFORMATION, PLANS, and ESTIMATE for the ERECTION of PEAT WORKS (or, if required, to superintend same), comprising the system embodied in the above patents.

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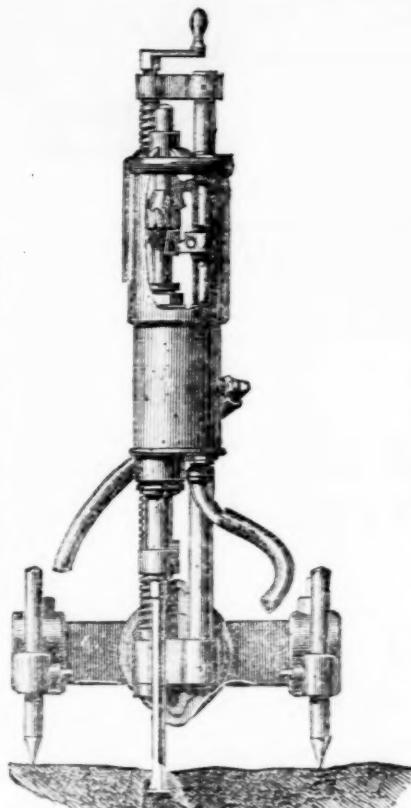


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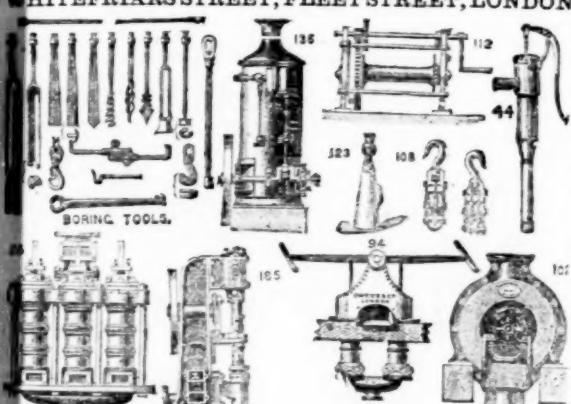
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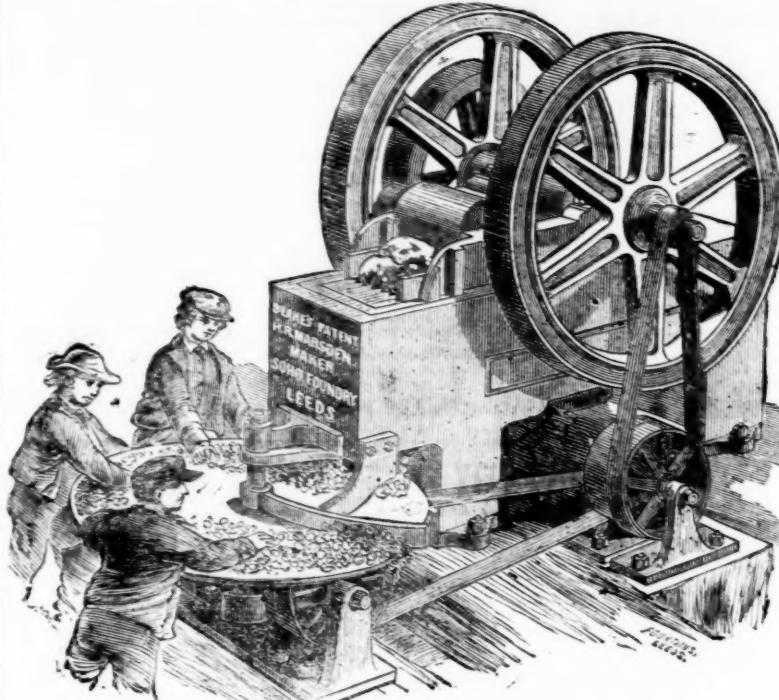
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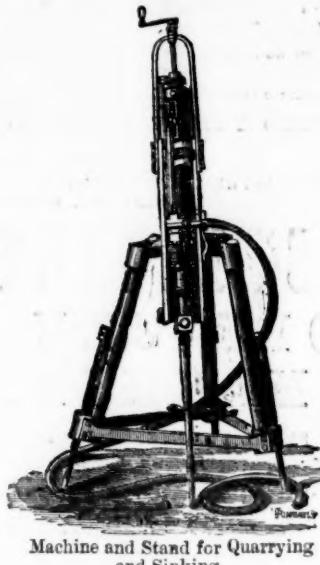
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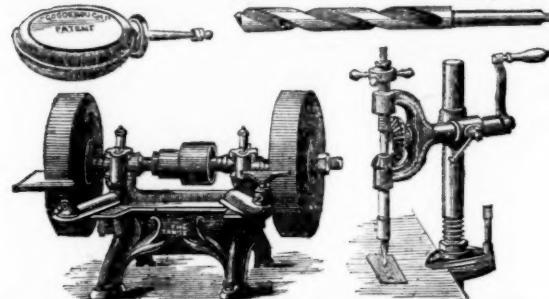


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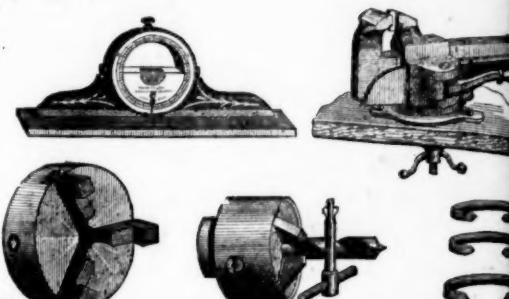
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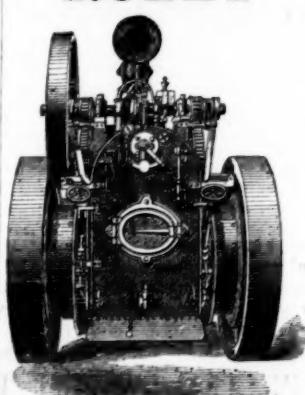
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